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NO railway accident since that in which Samuel Spencer was killed has so shocked the railway men of the United States as did that on the Illinois Central, which cost the lives of J. T. Harahan, F. O. Melcher, E. B. Peirce and E. E. Wright. Messrs. Harahan, Melcher and Peirce were widely known, the first as a former president of the Illinois Central. Mr. Melcher, besides being a prominent operating officer, had achieved great and deserved reputation and prestige by his work as chairman of the Special Committee on the Relations of Railway Operation to Legislation. He had retired from the chairmanship of the committee, but was still an active member. Mr. Melcher's death, because of the important work for all the railways that he had been doing, and was still engaged in, was an especially great loss to the railways of this country. As chairman of the Special Committee on Relations of Railway Operation to Legislation he developed a remarkable breadth of view regarding regulation of railways, and great skill in dealing with commissions, the lawmakers and the representatives of the railway brotherhoods, and in bringing about a good understanding and healthy co-operation between them and the roads at a time when such understanding and co-operation were peculiarly needed. He was thus successful in many cases, not only because he was a skillful diplomatist, but because he was also a clear-headed, honest one, who saw and contended that the railways could not consistently ask and could not hope to receive a square deal from others unless they were willing to give a square deal in return.

MR. PEIRCE was probably more intimately familiar with the work of the Interstate Commerce Commission than any other lawyer in the United States. He was the author of the Digest of Decisions Under the Act to Regulate Commerce, which Digest the commission uses as about its most important text book. He not only tried cases before the commission, but in many cases was of great service to the commission itself, having the confidence of the commissioners, and being recognized by them as an unusually broad-minded traffic expert, as well as a lawyer. Mr. Peirce had that unusual quality, which we recognize almost instantly in certain men, of being able to attack delicate matters in a straightforward way that precluded the possibility of giving offense. He was in the position of constantly having to tell the traffic men of his own company what they could not do, and this in cases that were of greatest importance, and yet he succeeded in retaining both their sincere regard and their entire confidence. Unusual quality in a lawyer, he was an advocate of frankness and practiced it.

PERHAPS the most suggestive feature of the report for 1911 of the New York Public Service Commission, Second district, is the return showing the gross magnitude of its corporate material and the reach of its official functions. It has jurisdiction of more than a thousand corporations of nine different kinds with a capitalization of more than four and a half billion dollars. It has held 572 public hearings, on an average of just 11 a week; it has had before it 2,321 questions raised, or an average of more than 7 a secular day and an increase over 1910 of nearly 13 per cent.; the number of days occupied in hearings has risen to 285 as compared with 196 in 1910, an increase of more than 45 per cent.; and in four years the questions before it have risen almost 44 per cent. If some of the questions have been simple and local, others have been complicated, general and necessarily of importance as precedent for future rulings, if for nothing else. And this is a commission that has jurisdiction of only part of a state, though a commonwealth of large corporate interests. The returns show strikingly how commission work in our states tends to increase. The more questions a state commission settles—or tries to settle—the more questions arise to be settled, and commission work makes the meat it feeds on. No wonder there has been in New York state complaint of the long delays. But the situation has its suggestions along more far-reaching lines. One is the tendency of the states to consolidate several commissions in one, which is thus almost sure to be overloaded. The other is the resulting and secondary tendency, as the powers and jurisdiction of state commissions expand, to trench upon the province of legislation. Just such a question is now about to arise in Connecticut over the right of the Public Service Commission to regulate freight rates and fares, which right, it is asserted by good lawyers, is vested in the legislature alone and cannot be delegated. Inside of the

states and bearing on intrastate corporations we are likely to see ere long very much such a confusion of powers between state commission and legislature as is now evident between federal and state authority in the matter of interstate commerce. There will then be plenty of additional work for the state courts, and besides this additional work for the state courts there will be the resulting appeals to the federal tribunals, already with too much work.

WE noted last week the postmaster general's jaunty proposition to buy up the telegraph lines—a little item of $250,000,000. The Taft administration having already committed itself in favor of a parcels post, the next natural move would seem to be an official pronouncement in favor of government ownership of railways. If Mr. Hitchcock can refer to English experience with government telegraph lines as a "notable" example of successful and profitable operation, it would be easy for him to found an argument on the history of foreign government-owned and tax-supported railways for railway nationalization in this country. The British government's experience in operating telegraph lines has recently been made the subject of an exhaustive study of Laws Webb, who apparently reads cold figures in a different light from some of our American politicians. He relates that when the project of taking over the British telegraph lines for operation by the postoffice department was first agitated in 1866 it was estimated for the benefit of Parliament that the probable cost would be $12,500,000, and that the net revenue would be 8.8 per cent. on the capital. A few years later, the estimates having been largely increased, Parliament appropriated for the purpose about $35,000,000. When the purchase was completed some more overlooked millions had swelled the capital cost to nearly $55,000,000. Frequent advances by Parliament of large sums to be used by the postoffice authorities for telegraph development have now brought the total investment up to $105,000,000. Since the first two years of government ownership, a large part of the interest on this enormous capital investment has not been earned, but has been a charge on the taxpayers; even operating expenses have not been earned in some of the years. Said the *London Spectator* of February 25, 1911:

> "When all these facts are taken into account—namely, the original capital which has never been repaid, the advances from Parliament upon which no interest is charged, and the annual deficiencies on working expenses—it will be found that the aggregate commercial loss to the country by the state purchase of the telegraphs is not less than $175,000,000. Nor can we console ourselves with the reflection that for this $175,000,000 the state has a valuable asset, for that asset, such as it is, involves every year of its working an additional loss of over $5,000,000."

Mr. Hitchcock is quoted as suggesting that the freedom of government-owned property "from taxation and other charges to which private corporations are subject," would make possible a reduction of telegraph rates. The state taxing authorities may be trusted to answer Mr. Hitchcock on that point. The rates of all privately-owned public utilities might be reduced by the abolition of taxation of them without resorting to government ownership. The general public might object, however, to supplying from its own pocket the taxes thus remitted in order to give cheaper service to the comparatively few users of the service of many public utilities; in the case of the telegraph, chiefly business houses and corporations. Similarly, railway freight rates might be lowered by the simple expedient of exempting the railways as at present owned from paying taxes that now require nearly 3 per cent. of their gross earnings, or over $100,000,000 annually. If other taxpayers would add to their present burden of taxes those now carried by the railways, the shippers might be able to save over 5 per cent. of their freight bills, meanwhile consoling the taxpayers with the assurance that the reduction in freight rates would be reflected in the prices paid by them for food, clothing and other things in their capacity of ultimate consumers.

ORE-LOADING DOCKS.

THE rapid growth in the volume of iron ore carried on the Great Lakes from the Minnesota and Michigan ranges to the furnaces in the Chicago and Pittsburgh districts, in keeping with the developments in the iron and steel business in all lines, has made necessary the provision of extensive loading facilities at upper lake ports and equally extensive unloading facilities at the receiving ports, as well as the building of numerous low grade railways equipped for very intensive operation, and the building of a large number of ore boats of greatly increased capacity. The latest available data shows that eight railways engaged in the iron ore business on the Minnesota and Michigan ranges own 24 docks for loading this ore to lake steamers at six upper lake ports. The total storage capacity of these docks is approximately 1½ million tons, or about 6 per cent. of the annual output of the ranges.

These docks consist of elevated structures supporting hoppered bins, into which ore is dumped from cars running over the structure and from which it runs by gravity into ore boats anchored alongside. The type of dock in general use has not materially changed in the last 20 years, the supporting structure being a framed timber trestle and the bins being built entirely of wood. The life of the superstructure of such docks has been found to be from six to eight years, while in some cases the portion below the bin floors has shown a life of 20 years. In addition to the high cost of maintenance necessary on such a structure, the principal objection to this type of dock has been that the danger from fire is very great. Two new docks were placed in service during the past season, and one is now being completed to go into service next season, which eliminate as far as possible the use of wood in their construction. The general dimensions, height, width of pocket, slope of floor and length of spout, are interdependent and must be worked out to meet certain requirements of service and design. The spouts when in the loading position must clear the holds of an empty ore boat; the width of pocket, slope of floor and arrangement of doors and spouts must provide for the most rapid emptying of the pockets, and the relation of height to width must be designed to give the most economical use of material per lineal foot. The length is determined by conditions in the harbor and by the capacity desired.

The large number of new docks that have been built has provided ample opportunity to test various combinations of these dimensions, and the effect of such changes is now well understood. It is natural, then, that in changing the design to eliminate wood the general form and dimensions of the old timber docks should be in large measure retained. The new docks mentioned illustrate three distinct forms of construction and will furnish some interesting comparisons. The Duluth & Iron Range dock at Two Harbors, described in the *Railway Age Gazette* of January 5, is essentially a steel trestle, concrete being used only for foundations and bin partitions. The Great Northern dock at Allouez, described in this issue, utilizes concrete entirely for the supporting structure. The usual form of trestle is modified to form massive concrete columns non-reinforced, which support the bins and tracks. The Lake Superior & Ishpeming dock at Presque Isle combines steel and concrete in its construction, the steel framework being designed to carry the load and the concrete in the columns serving principally to protect the steel.

An important incidental advantage in the use of these more permanent forms of construction is the fact that the additional strength of the substructure allows the capacity of the bins to be increased, reducing the length necessary for a given storage capacity. Timber docks have used 175-ton pockets quite generally, while the three new docks mentioned have pocket capacities ranging from 250 to 325 tons. In all three of these structures special details have been worked out to facilitate the loading of ore and thereby increase the efficiency of the dock as an ore-handling machine. In all three the pitch of the bin floors is

greater than 45 deg., which was formerly quite generally used. In each case the operation of spouts and doors is effected by motor equipment, instead of by hand, as in older designs. In the latter two the most important change is probably the substitution of curved steel bin ends for square wooden ones, which is expected to eliminate to a great degree the arching of the ore. In the first dock mentioned the most improved type of door yet designed was installed. The influence of these improvements is shown in the records already made by the two docks in service, and the future performance of all three of them, both as to loading records and cost of maintenance, will be carefully watched by engineers responsible for the design and maintenance of similar structures.

THE LEHIGH VALLEY AND THE COMMODITIES CLAUSE.

IT is not at all unlikely that the troublesome "commodities clause" of the Interstate Commerce Act, which has already been twice before the Supreme Court, may have an opportunity to appear there again, as a result of the action last week of the directors of the Lehigh Valley Railroad Company and of the Lehigh Valley Coal Company. The Supreme Court over two years ago, in the Delaware & Hudson case, seemed to hold that the clause forbidding a railway to transport in interstate commerce, except for its own use, commodities which it owned, did not prohibit the transportation of coal owned by a company whose stock was held by a railway. However, in the Lehigh Valley case last April, the court declared that such interpretation was justifiable only when the affairs of the two corporations were not "commingled." If the two corporations were one for all practical purposes the commodities clause was effective. This decision overruled the lower court, and gave the government permission to file an amended bill against the Lehigh Valley. The directors of the Lehigh Valley, instead of adopting the expedient resorted to by the Lackawanna, and distributing the stock of the coal company to the railway shareholders, propose to resort to an entirely unique scheme for solving their difficulties.

This is to organize a Lehigh Valley Coal Sales Company, incorporated under the laws of New Jersey with an authorized capital of $10,000,000. A contract with the sales company is to be entered into by the coal company under which the sales company will purchase and sell all the coal of the coal company. A dividend has been declared by the railway company just sufficient to pay for the shares of the sales company, which will therefore be distributed pro-rata to the railway shareholders. However, there is no obligation on the part of the railway stockholders to subscribe for sales company shares. They may, if they choose, take their dividends in cash. The outcome of the plan will be a mining company operating as an industrial corporation in the state of Pennsylvania owned by a railway company, but transporting none of its product, and a buying and selling corporation which buys and ships coal, but whose stock is owned by individuals. It will be for the courts to say whether this arrangement constitutes the "indirect" ownership contemplated by the commodities clause. It would seem that the courts could do nothing but hold the plan to be a legal one. Certainly the fact that no prosecution has been undertaken against the Lackawanna since its distribution of coal shares, and that the combined holdings of a group of individuals of Great Northern and Northern Pacific stock subsequent to the dissolution of the Northern Securities Company has been permitted to go unchallenged, would lead to this conclusion. Whether or not in fact the situation is the same before and after such a reorganization depends upon the closeness with which the securities are held. But, however one may sympathize with the financial difficulties with which these corporations have had to contend in their attempts to meet the requirements of the law, one is forced to conclude that the commodities clause as yet has failed to effect the purpose intended by Congress and has simply been the means of wasting large sums of government money in futile litigation.

ODESSA AND KINMUNDY.

THE disastrous rear collision at Odessa, Minn., December 18, is at last explained, the railway commissioners of that state having made a report; and the causes are given in another column of this issue of the *Railway Age Gazette*. The behavior of the steel sleeping and dining cars was described in our last issue. As we receive these particulars by mail, the telegraph brings a report of a still more startling collision of a similar character, that at Kinmundy, Ill., Monday morning, January 22, about 12½ o'clock. This last is more notable, because though the victims are less numerous, three of them are prominent and widely known railway men. It is a repetition of the disaster that killed Samuel Spencer, president of the Southern Railway and six other men, at Lawyer, Va., November 29, 1906. The disheartening feature of both of the cases now reported is that the causes are of the same old familiar character. In the means of preventing collisions there has no doubt been a good deal of progress in late years, but none of this progress seems to have had any effect in the localities where these collisions occurred.

The first thing necessary in removing the root of this disgraceful feature of American railway practice is to exclude from the discussion all secondary matters. The qualities of steel cars as compared with wooden may be discussed with profit in the proper place, but that discussion does not assist in preventing collisions. The St. Paul road may have been too strenuous in its efforts to carry costly shipments of silk across the continent in record-breaking time, but that is far aside from the main issue, for no block system is worthy of the name unless it protects all trains, at whatever speed they may be running. And flagging is a secondary matter. Everybody seems to worship the Standard Code, and especially Rule 99, with all the fervor of the ancients who lived in A. D. 1886; but the cold fact remains that to depend partly on the block system and partly on the flagman is an effort to sit on two stools, which never can be defended; that has caused trouble times without number, and that at last has shown its weakness so plainly that even the uninstructed public understands and marvels at the crudity of the practice. At Odessa, the engineman, the conductor and the rear brakeman all failed; but this must not blind us to the fact that the most elementary block system, properly managed, would have held second 18 at "Junction" until first 18 reached Appleton, whether the journey required 20 minutes or 20 hours; whether the leading train stopped once or a dozen times. At Kinmundy, the conductor, flagman and engineman were all negligent, and apparently grossly negligent, and so must bear the immediate blame; but the block system was not in use. Under the time interval system, as there used, for a train falling back on the time of a following train of the same class, the flagman, with his hand signals, visual and audible, was the only protection. The reports thus far received seem to indicate that at midnight—when the collision occurred—the stations at which a ten-minute interval could be maintained were 14 miles or more apart. If, with the time interval system, the stations are far enough apart and the speed of the following train is sufficiently faster than that of the leading train—the trains being of the same class—the second train will overtake the one preceding while running normally; and this is in full accordance with the standard code! In this case, however, the engineman seems to have disregarded a fixed signal, there being a crossing at Kinmundy.

There can be no doubt that this tragedy will stimulate progress in the introduction of the space interval. The lesson, of course, is to use the block system, *fully*. To have the system on the books, but not regularly use it; to use any modification, and expect it to be as good as absolute blocking, or to employ the space interval under any but the strictest supervision, means danger. It is a matter of deep regret that this must be said concerning a road which, like the St. Paul, was a pioneer in its appreciation and introduction of the space interval. For an operator, *and a despatcher*, to allow a fast train to follow another fast train into a block section on a clear signal when the

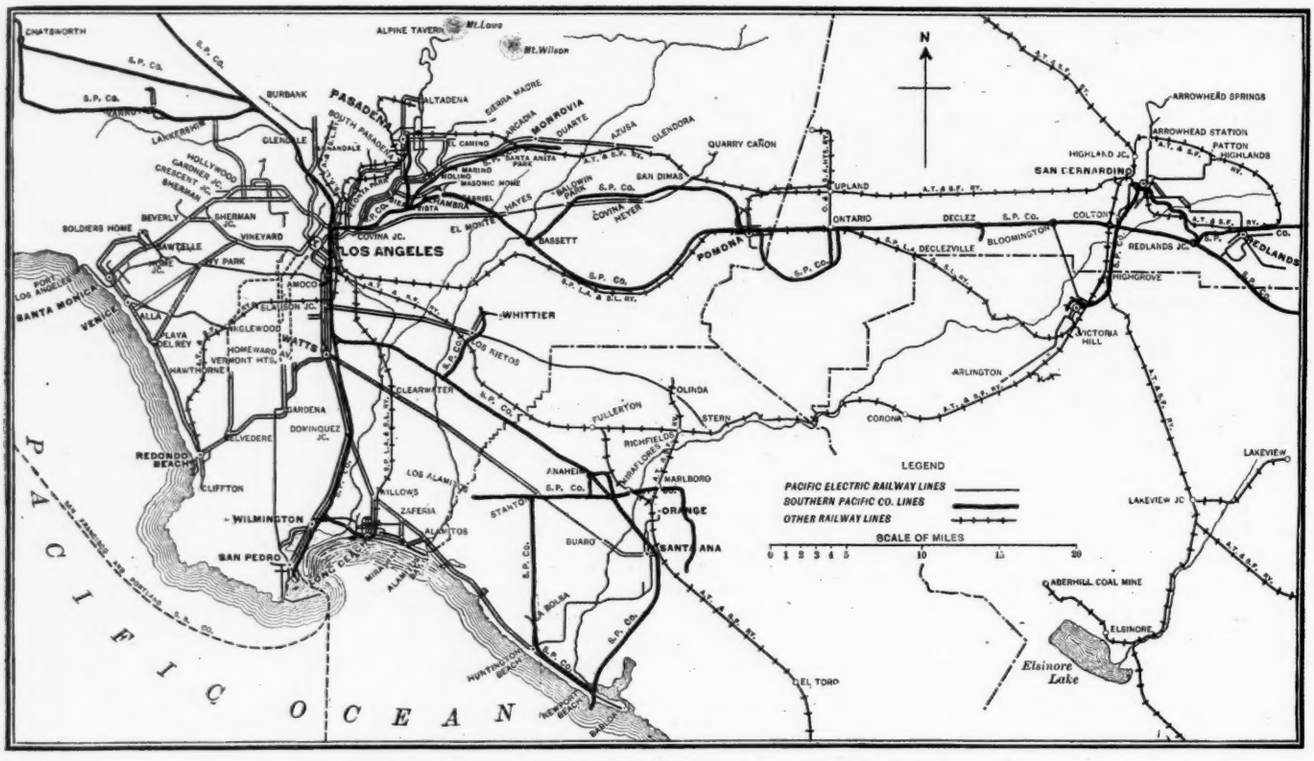
leading train is reported as having *almost* reached the outgoing end of the section, can only indicate that the habit of mind of these men has been cultivated in a mental atmosphere where old rule-of-thumb methods and not space interval methods prevail.

The Minnesota commissioners say that the block section was too long (21 miles) and as a practical matter could not be operated; and that the practice "persuades" employees to take chances and officers to wink at such looseness. This expression on the part of the commissioners no doubt reflects the tone of the testimony that they heard. Whether it does or does not so reflect, it is a fact that it would fit the actual situation on more than one road. To be "persuaded" to incur danger by disregarding a rule of safety is something that ought not to happen with any railway man who is in his right mind; and yet it is quite likely that the Minnesota commissioners, notwithstanding some illogical statements in their report, exercised a pretty clear vision in this matter, and are here giving a true picture of the situation as they found it. "Taking chances" has not been exterminated on American railways. A section 21 miles long is as easy and simple to manage as a short section, if only the superintendent determines actually to use the block system and to abolish those loose practices which seem to be inseparable from the time-interval system. With 20-mile sections trains running at a mile a minute must keep apart 20 minutes plus the time necessary to convey the message, work the signal and give space for the engineman to read it. The trouble in cases of this kind usually turns out to be that instead of delaying trains to make the time interval correspond to the length of the block section, the block system is "modified" for the purpose of making the system conform to a time interval which is too short. This idea will always be impossible of accomplishment, for a "modified" block system means an abandoned block system.

The commissioners propose to investigate the use of the manual block system. It is to be hoped that their investigation will extend to England. All that they may desire to learn as to the principles of the system and to its success, when used in a normal way, will there be found ready to their hands, without any labor of investigation. They could find some good practice in America, but not so much of it. Our American managers have turned to automatic signals whenever they felt the need of improving their manual signaling, and therefore in many cases no doubt the manual system has not been perfected as it should have been. But no well-posted railway officer needs to be told that it is the best safeguard against collisions until he gets the money for the installation of a more complete system. The Minnesota commissioners can have no difficulty in finding what is the best system, in any given situation; their inquiry will have to be directed rather to the question how to insure the regular and rigid use of the best system after it has been installed.

SOUTHERN PACIFIC COMPANY.

THE two factors that in addition to the increase in wage scales common to all railway companies, account for the reduction in net earnings of the Southern Pacific Company and proprietary companies from $51,760,000 in 1910 to $47,620,000 in 1911, were a considerably shorter average haul for freight and an increase in passenger train mileage out of proportion to the increase in passenger business. The shorter average haul reduced gross revenues, and the increased passenger train mileage increased transportation expenses. While the total number of tons of freight carried amounted to 26,710,000 in the fiscal year ended June 30, 1911, as against 25,960,000 in 1910, and the average revenue per ton per mile was 1.175 cents in 1911 and 1.162 cents in 1910, the average haul was 232 miles, as against 255 miles, so that gross revenue from freight amounted to $73,680,000, a decrease of $3,340,000, or 4.34 per cent. from 1910. Transportation expenses totaled $36,520,000 in 1911, which is more by $870,000, or 2.43 per cent., than in 1910.



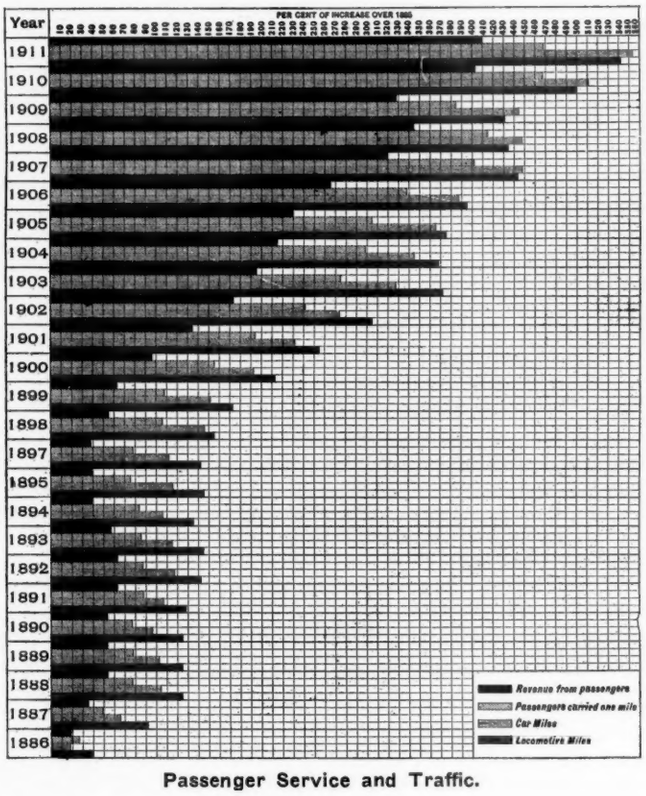
The Southern Pacific's Electric Lines Near Los Angeles.

In judging of the future earning power of a road as contrasted with judging of its showing made in one year as compared with the previous year, the three most important factors to be taken into consideration are the territory through which the road runs, the organization of its forces and the policy of the management toward upkeep. The Southern Pacific has a lion's share of quite a part of the transportation business of southern California, one of the richest and most rapidly developing sections of the United States. It has a main line across southern Louisiana and through Texas that enables it not only to share in the agricultural and business development of this territory, but to carry on a very profitable water and rail transcontinental business from New

York. It has two lines connecting Los Angeles and San Francisco, which give it a share in the agricultural business being developed in the San Joaquin valley, and a monopoly of the passenger business between Los Angeles and San Francisco by the coast route. The coast route serves Santa Barbara and Del Monte, and similar summer and winter resorts. Finally, the Southern Pacific has a main line running from San Francisco to Ogden, over which Union Pacific transcontinental freight moves.

The Southern Pacific's problem in organization was extensive, not intensive. This is especially true of the Sunset Lines and coast lines. Divisions are necessarily very long; labor available for trainmen is comparatively scarce, and there is a generally more independent spirit and less respect for law and order than is found in the more fully settled parts of the country. Notwithstanding these physical difficulties, the Southern Pacific has perfected an organization so unusually strong that it has been a most important factor in bringing about the prosperity of the company. The organization is a modification of the Hine system of unit arrangement, but whether or not the *form* of organization has been responsible for its strength, the important fact is that the Southern Pacific gets a grade of officer and a loyalty of service that are comparable to those of the best roads in any part of the country.

The Southern Pacific spends between $1,500 and $1,600 per

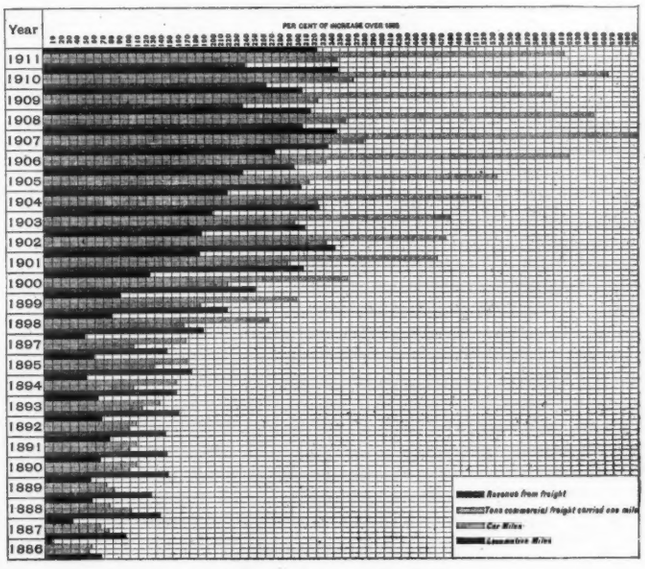


Passenger Service and Traffic.

mile of all main track for maintenance of way and structures, and over $3,500 for repairs and replacements of locomotives per locomotive. However, unsatisfactory these two units of "main track mile" and "locomotive" are for accurate comparisons, the sums spent by the Southern Pacific would in any case indicate a very high standard of maintenance, and this is borne out by the condition of the property itself.

In 1911 the total amount of revenue freight carried, as was previously mentioned, was 27,430,000, and of this tonnage, 20.89 per cent. was furnished by products of agriculture. This products of agriculture tonnage was 580,000 tons, or 11.34 per cent., more in 1911 than in 1910. Products of mines furnished 28.79 per cent. of the total tonnage; products of forests, 19.94 per cent., and manufactures, 16.32 per cent. There is a rather interesting increase in the tonnage of stone, sand and like articles from 2,140,000 tons in 1910 to 3,400,000 tons in 1911, an increase of nearly 59 per cent. It was, notwithstanding this large increase in traffic which presumably bears a low ton-mile rate, that the company got a somewhat higher average ton-mile rate for all classes of freight in 1911 than in 1910. It is possible, however, that this is explained by the much shorter average haul.

The Southern Pacific has rather high grades on some of its lines and carries a comparatively small proportion of low grade freight, so that we would expect to find a rather small average train load; and, compared with the Hill Lines, the train load is small. In 1911 the average tons of commercial freight per train



Freight Service and Traffic.

was 397, as compared with 396 in 1910. The Southern Pacific has, however, over both its San Francisco-Ogden line and its Los Angeles-New Orleans line a great deal of freight moving on fast schedule, not permitting of heavy train loading. This fact also helps to explain the high average ton-mile rate which the company receives.

The Southern Pacific does not, like the Union Pacific, make a distinction in paying its dividend as between profit from railway operations and profit from banking operations. The banking operations of the Southern Pacific have had largely to do with the financing of its subsidiary companies, and for this reason are quite different from the investments of Union Pacific in Baltimore & Ohio, New York Central, etc. In 1911, after the payment of all fixed charges and rentals, and 6 per cent. dividends on the common stock, the Southern Pacific had a surplus of $9,730,000. This compares with a surplus of $18,180,000 after the payment of dividends in 1910; but it will be recalled that in 1910 the company received an extra dividend of $4,590,000 from Wells, Fargo & Company stock. The decrease in surplus, therefore, as between the two years is not as large as it looks. Ninety-one million, seven hundred and thirty thousand dollars is a comfortable margin over dividend requirements.

In 1911, besides its expenditures for maintenance, the company spent $11,060,000 for additions and betterments, $24,860,000 for construction and acquisition of new lines, and $12,620,000 for stocks and bonds. These expenditures, together with advances to electric lines in California and certain other advances to subsidiaries, totaled $53,370,000 charged to capital account in the past year. The sum spent for additions and betterments was more by a little over $1,000,000 than was spent on this account in 1910. The most noticeable increase in betterment work is the putting in place of 3,004 lineal feet of concrete and steel structures in 1911, as compared with 1,661 ft. put in place in 1910. There was on the other hand $2,350,000 spent in 1911 for additional main track, as compared with $3,930,000 spent for additional main track in 1910.

During the year the total funded debt outstanding increased only $2,350,000, with no increase in capital stock. In addition to

this slight increase in funded debt, the company borrowed from the Union Pacific $9,110,000, making the total amount on June 30, 1911, owed by the Southern Pacific to the U. P. $20,000,000. This is included in current liabilities, which in the aggregate totaled $43,800,000, an increase of $7,800,000 over 1910, and compared with total current assets of $56,890,000 at the end of 1911, as against $49,590,000 at the end of 1910. These current assets include $11,140,000 cash and $24,960,000 time loans and deposits.

The large sums advanced to subsidiary companies, the comparatively small amount of financing done last year and the size of the debt to the Union Pacific suggest that some time within the next year, or so, the company will either itself issue a considerable amount of securities, or its subsidiaries will.

The par value of stock other than those of subsidiary companies owned by the Southern Pacific amounted to $119,000,000, an increase over the par value of stocks owned at the end of 1910 of $52,700,000. The principal changes were the sale of $2,250,000 stock of the Los Angeles Railway Company and the purchase of $21,000,000 stock of the Los Angeles Pacific Company; $12,000,000 stock of the Peninsular Railway; $10,000,000 stock of the Pacific Electric Railway, and $5,000,000 stock of the Los Angeles Pacific.

The passenger business on the Southern Pacific is more than usually important to the company from the point of view of earnings. Of the total earnings from rail lines in 1911 of $121,910,000 $73,680,000 was from freight and $40,810,000 was from passenger business. The importance of the beautiful coast country between Los Angeles and San Francisco has already been mentioned. The growth of Los Angeles itself has been extraordinary. The population of Los Angeles increased in the decade between 1900 and 1910 from 102,479 to 319,198, an increase of 212 per cent., and Pasadena, just outside of Los Angeles, increased in the same ten years from 9,117 to 30,291, an increase of 232 per cent. The Southern Pacific found that the interurban railways, especially those around Los Angeles and connecting Los Angeles with the coast, could be used to advantage as feeders for the steam railway. The company bought in 1903 half of the stock of the Pacific Electric, which was building out from Los Angeles into the surrounding territory. H. E. Huntington owned the other half of the Electric railway's stock, but in November, 1910, sold his holdings to the Southern Pacific, and after the Southern Pacific had bought stock of other railways radiating from Los Angeles, a new company—the Pacific Electric Railway—was formed and took over a total of 490 road miles of electric railways used for both freight and passenger service. Of this road mileage, 270 miles are double-track and 11 miles have four tracks. Some idea of the electric company's freight business may be had from the fact that the company owns 14 electric locomotives, 33 express freight motor cars, six express freight trailers and 1,115 other freight train cars. The earnings of the company for the four months ended October 31, 1911, totaled $3,060,000, and after the payment of expenses and taxes the company had net $1,060,000. The total bonds of the company amounted to $49,690,000, and of these the Southern Pacific Company owns, in addition to all the stock, $20,940,000.

The principal figures for operation of the Southern Pacific Company and proprietary companies in 1911, as compared with 1910, are given in the following table:

	1911.	1910.
Average mileage operated	9,895	9,752
Freight revenue	$73,677,293	$77,018,554
Passenger revenue	40,814,400	40,244,856
Total rail operating revenue	121,911,028	124,423,905
Maint. of way and structures	15,889,130	16,098,705
Maint. of equipment	15,312,206	15,808,391
Traffic	2,947,064	2,481,186
Transportation	36,524,585	35,658,046
Total rail operating expenses	74,521,660	73,514,034
Taxes	4,850,348	4,519,374
*Net operating income	42,764,978	47,238,385
Gross corporate income	49,393,755	†57,947,565
Net corporate income	26,117,207	35,463,218
Appropriated for water power examinations	26,215	46,323
Dividends	16,361,426	17,238,347
Surplus	9,727,566	18,178,549

*After clearing outside operations.
†Includes $4,756,011 extra dividend on Wells, Fargo & Co. stock.

Letters to the Editor.

INCONSISTENCY IN SIGNAL LIGHTS.

Boston, January 3, 1912.

To the Editor of the Railway Age Gazette:

Mr. Whitney talks interestingly on classification signals, in your issue of December 29, commenting on "D. A. D.'s" splendid suggestion to make this a positive instead of a negative proposition, as now. He assumes, however, the necessity for a continuance of the present green light or flag on the engine. Is it not about time to do away with this, substituting yellow? Let us be consistent all the way through. Years ago, the New York, New Haven & Hartford, followed by other roads, adopted green for "proceed" and yellow for "caution" in fixed signals. "There was a reason"—and it is obvious.

There is a like good reason for abolishing green on engines. In foggy or stormy weather, with the red light of a home signal at a crossing or crossover obscured or extinguished, the engineman may see the green light on an engine or caboose and mistake it for a "proceed" light in the fixed signal, and things begin to happen.

Why not be consistent and substitute yellow for markers on cabooses and for the "following section" signal on engines? We are today using one color not only for various meanings—but for diametrically opposite meanings. In one case we flash a green light in the engineman's face to convey to him the information that another train is following and to keep clear of it; and then use the same colored light to tell him all is well and that he may proceed on a clear track.

D. A. G.

San Francisco, Cal., January 9, 1912.

To the Editor of the Railway Age Gazette:

You conclude your comments on my letter published in your issue of December 29 by saying: "The *Railway Age Gazette's* remedy for the faults of classification signals is to use the block system and do away with such signals entirely."

Your statement is open to contradiction. From the standpoint of safety alone the use of a block system of Utopian perfection would enable classification signals to be entirely done away with, but from the standpoint of convenience it would hardly be desirable to do so. These signals are necessary in order to prevent delay to following sections. Suppose classification signals are done away with; and a freight train, delayed between telegraph stations, is waiting in a blind siding for an opposing passenger train running in two sections. The freight has been given no telegraph notice of the existence of the second section. Irrespective of any block system, if the freight pulls out in the face of the second section there will be a delay which could have been avoided had classification signals been carried by the first section. Wherever the time table is used as authority for the movement of trains, classification signals are necessary.

M. B. WHITNEY,
Student in Operation, Southern Pacific.

"D. A. G." ignores our recommendation to depend wholly on the block system, and the other correspondent thinks that the recommendation cannot be carried out. We forgive "D. A. G.," because he is a superintendent and his sense of responsibility to ancient traditions forbids him to adopt so radical a proposition. As it is "a condition and not a theory" that confronts him, we endorse his plea for consistency. The New York Central already has adopted yellow for the side and front glasses in tail end markers. Even without the block system, the running of trains without classification signals in front has been successfully carried on. If we remember correctly it was the practice on the Canada Southern for several years. The answer to Mr. Whitney is that the supposed troublesome practice outlined by him is already in effect, and is not troublesome. It is on the Southern Pacific, in the snowshed district, where the train staff is used. Trains do not "pull out of blind sidings."

It is true that the staff system makes a complete block system, and that blind sidings have no place in a respectable block system; but "Utopian" is hardly a proper word to apply to the case. It is true that "wherever the time table is used as authority for the movement of trains," classification signals may be necessary; but the beauty of the block system is that the time table is not used as an authority for the movement of trains. And this applies to every-day American railways, a good way this side of Utopia.—EDITOR.

FALLACIES IN FIGURING COST OF FREIGHT CAR REPAIRS.

CHICAGO, January 6, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The usual method of figuring the cost of repairs to freight cars per car mile—viz., dividing the total freight car miles, system and foreign, into the total cost of repairs to system and foreign cars, plus the Master Car Builders' vouchers payable, less Master Car Builders' bills receivable—is likely to lead to some erroneous deductions as to the efficiency of the mechanical department with respect to this phase of its work, unless consideration be given to the important factor of equalization of car balances during the period under analysis. As the M. C. B. rules are amended from time to time, increasing the owners' reliability for repairs to their cars while on foreign lines, the necessity for considering this matter increases.

Under M. C. B. rules owners are responsible for practically all defects arising from the ordinary wear and tear to equipment due to use, the borrowing line having to pay only for repairs due to rough usage, wrecks, and destroyed cars. The theory is that the per diem payment covers interest, depreciation and repairs. But under the Interstate Commerce Commission's rules, no portion of the per diem earnings are credited to freight car repairs. It is, therefore, evident that in the case of a road owning 1,000 cars and borrowing 500 foreign cars, the cost of keeping up repairs to one-third of the total equipment making mileage, is paid by the owning road by Master Car Builders' vouchers. The owning road is, of course, reimbursed through the per diem account, but the cost of repairs per car mile as usually figured would be lessened, and the usual inference is that the mechanical department has made a good showing, whereas a careful analysis might show just the reverse condition.

FREIGHT CAR REPAIRS PER CAR DAY, BASED ON M. C. B. BILLS RECEIVABLE AND PAYABLE.

Month.	Year.	Foreign Car Days on R. I.	M. C. B. Bills Receivable.	Cost per Car Day.	R. I. Car Days on Foreign Lines.	M. C. B. Bills Payable.	Cost per Car Day.
January							
February ..							
March							
Total							

On the other hand, if the road is one which loans its equipment to a considerable extent, as for example, a heavy coal-carrying line, it should readily be seen that the expense for maintenance of this equipment has to be charged to the mechanical department, but as the foreign mileage made by such equipment cannot be included in the divisor, the cost per car mile increases.

It is, of course, difficult under the present car accounting method of only reporting car days and not the mileage of foreign equipment to ascertain the mileage of equipment when away from its owner's rails. In the absence of such data, the next best course is to estimate the mileage made, which will give the nearest approximation to the real situation. In making the estimate consideration should be given to the class of equipment away from home. If it is relatively of the same class as the foreign equipment used, it would seem reasonable to assume that the holding road makes as many miles per day with such equipment as is made with foreign equipment on your own line.

It occurs to me that a comparison from month to month, or from year to year, of the M. C. B. bills made against the foreign car days and private line car days on your own line and the M. C. B. bills paid against the system car days on foreign lines, would give some interesting figures. It should, of course, be appreciated that a single month's bills and mileage would not be a criterion, and that the comparison should include several months in order to get a general average. The accompanying form is suggested for keeping track of this matter, which may be of value to others, and it is hoped it may lead to a more general investigation and discussion of this important subject.

N. D. BALLANTINE,
Superintendent Car Service, Rock Island Lines.

THE FULL COST OF FREIGHT MOVEMENT.

PITTSBURGH, Pa., January 15, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

We are all familiar with statements showing cost per car mile and cost per ton mile; but do we take all important factors into account? The expense of delays to cars is not considered. It is expensive for cars to remain idle, also expensive for cars to meet with delays while enroute.

Assuming that cars are worth twenty cents a day when idle, $1.20 when moving empty, and $4.80 when moving loaded, we can figure the cost of car movement, with a more just and accurate result.

On any given date the general manager could have before him, for example, a statement showing car movement for a certain day as follows:

1,000 cars idle 1 day @ 20c.....	$200
1,000 delayed empty car hours @ 5c.....	50
1,000 delayed loaded car hours @ 20c.....	200
Total	$450

This expense should be added to the cost per car mile as now obtained from cost of crew, supplies, etc.

The cost of holding engines for trains is calculated very closely, but the delay to cars is not given so much attention. The enormous tonnage of a certain engine moving over the road is frequently exhibited as a stroke of economy, but the delay incident to such movement is not shown.

If a train of 30 loaded cars were scheduled to move a certain distance in 12 hours, but consumed 14 hours in making the run, we have 60 delayed loaded car hours at twenty cents, an expense of $12, which should be taken into account when considering the train expense. The same cars are allowed on the schedule a dead time of one hour to pass through the yard at a terminal, but if they consume two hours, there is an expense of $6, which should be charged to the yard expense.

The old saying that whenever the wheels stop turning the company is losing money, can be more readily appreciated when the figures are thus placed before us.

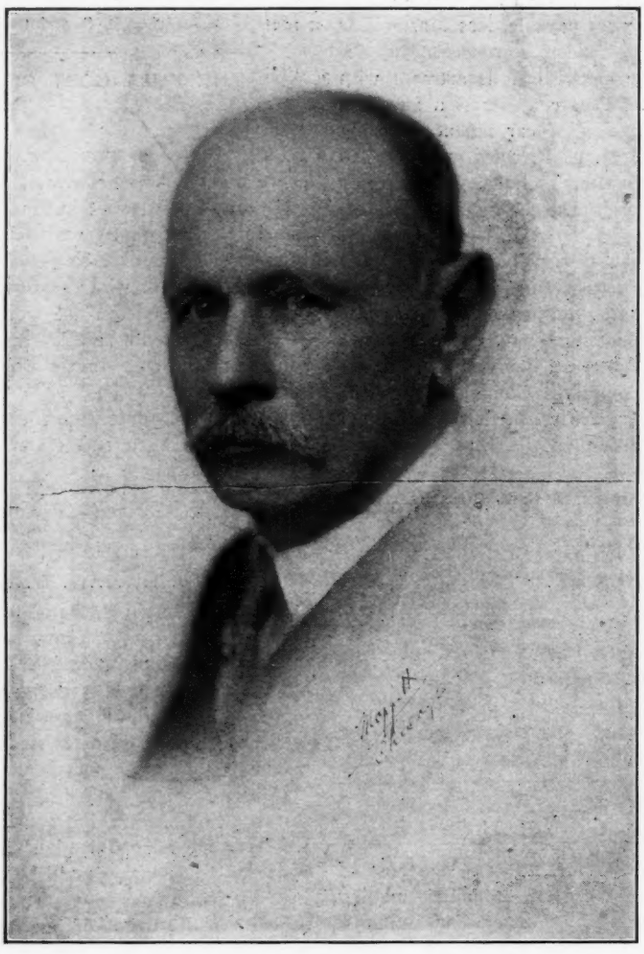
There is also the expense of paying claims when cars reach destination behind the schedule quoted to shippers by the soliciting agent.

CLIFFORD VAN ALLEN,
Trainmasters' Clerk.

When the proposition was made in 1897 for the Swiss government to buy the five principal railways of Switzerland, estimates of the cost of each were presented, the aggregate being $192,400,000. The plan was carried out, and it is now reported that the actual cost was $239,000,000, 24 per cent. more than the estimates. The company with the largest system obtained one-third more than the estimate.

RAILWAY OFFICERS KILLED IN COLLISION.

A rear collision on the Illinois Central at Kinmundy, Illinois, in the early morning of Monday, January 22, resulted in the instant death of J. T. Harahan, former president of the Illinois Central, Chicago; F. O. Melcher, second vice-president of the Rock Island Lines, Chicago; E. B. Peirce, general solicitor of the Rock Island Lines, Chicago, and E. E. Wright of Memphis, Tenn., attorney for the Rock Island for Tennessee. The accident occurred between 12:30 and 12:35 a. m., while they were asleep in Mr. Melcher's business car, attached to the rear of train No. 25, the Illinois Central's New Orleans Express, southbound, which was run into by train No. 3, the Panama Limited, after No. 25 had stopped at 12:30 a. m. at Kinmundy station to take water. The business car was of all-wood construction, while the other cars in both trains were of all-steel construction. The members of the party were on their way to Memphis on business connected with the plans of the Rock Island for building new freight terminals and a bridge across the Mississippi river at Memphis. Mr. Harahan, who retired last year as president of the Illinois Central, was recently elected president of the Arkansas & Memphis Railway Bridge & Terminal Company, a corporation organized to make the improvements. The other members of the party in the car—T. S. Buzbee, attorney for the Rock Island for Arkansas and Louisiana, and Byram Curry, secretary to Mr. Melcher—and two porters, escaped without injury, as they were in the forward part of the car. No passengers on either train were injured, but the fireman on No. 25 and the engineer on No. 3 sustained slight injuries.



J. T. Harahan.

Kinmundy, where the collision occurred, is on the main line of the Illinois Central, 227 miles south of Chicago and 23 miles north of Centralia. It is south of the territory covered by the automatic block signal system as at present installed. An installation of automatic block signals to cover this portion of the line had been authorized as far south as Mason, 17 miles north of Kinmundy.

Inspectors representing the Interstate Commerce Commission and the Illinois Railroad & Warehouse Commission proceeded to the scene of the wreck early on Monday.

The New Orleans Express leaves Chicago at 5:50 p. m., and is the coach section of the Panama Limited, a sleeping car train which leaves Chicago at 7 p. m. No. 25 was 38 minutes late at Kinmundy, where it was scheduled to stop at 11:52 p. m., and No. 3 was nearly on time. The two trains were reported at Edgewood, 14 miles north of the scene of the accident, at 12:10 and 12:20 a. m. respectively. The regular time interval between trains on this portion of the line is 10 minutes. The express had not finished taking water at Kinmundy, and it was still at the station when it was struck by the engine of the limited, which was not to stop at that point and was running at its regular rate of speed. It is estimated that the speed was 25 miles an hour when it struck. The flagman appears to have gone back a very short distance, and he is reported as declaring to the conductor that the engineman of No. 3 answered by whistle, acknowledging that the red light was seen, but just when this was does not appear. The force of the collision was so great that the standing train, with brakes locked, was pushed 200 ft. ahead. The conductor of No. 25 is reported as claiming that at Effingham, 29 miles back, he had told the flagman that the limited was less than ten minutes behind, and to make a quick run to the rear when the train stopped at Kinmundy for water. A freight train immediately ahead of No. 25 delayed it in getting water.

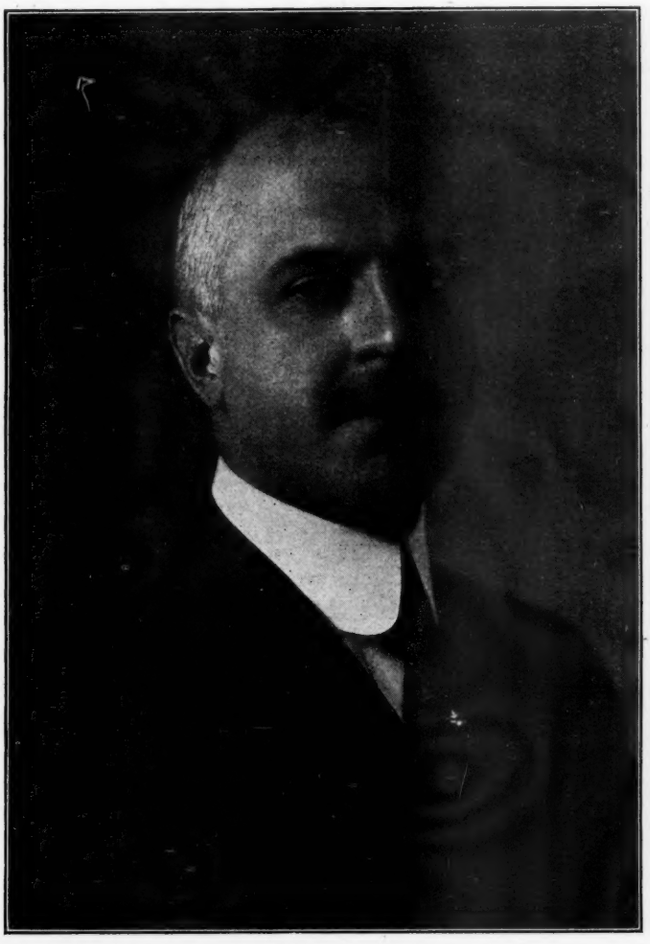
Mr. Melcher's car was of wood, while the other cars in both trains were all-steel. No. 25 consisted of six steel coaches and steel chair cars, in addition to the private car, while No. 3 consisted of eight all-steel cars. The locomotive penetrated halfway through the business car doing the worst damage on the right side, where the staterooms were, while other cars in both trains were not damaged, although the passengers were badly shaken up. The bodies of Messrs. Harahan, Melcher and Peirce were brought to Chicago on a special train on Monday, and that of Mr. Wright was sent to Memphis.

The Illinois Central management immediately ordered a public investigation into the causes of the wreck, which was begun at Champaign, Ill., on Tuesday. W. L. Park, vice-president and general manager, conducted the hearing, and the following were appointed as members of the investigating board: R. W. Baxter, general superintendent of the Illinois Central; H. Battisfore, superintendent of the Illinois Central; J. B. Berry, chief engineer of the Rock Island; W. F. M. Goss, dean of the engineering department of the University of Illinois; G. L. Pittinger, of Champaign. This board, on January 24, issued its finding, which follows in part:

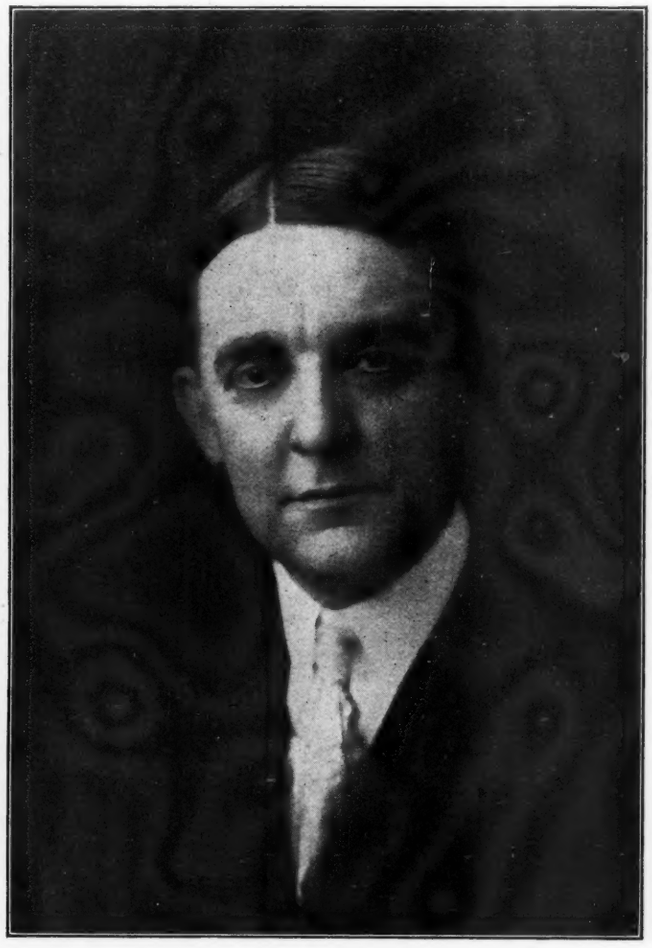
"Testimony showed that the rules of the company governing the movement of these trains were clear and definite and thoroughly understood by the crews of the respective trains. It was fully developed and clearly shown that the management had by rules and systematic instruction to the trainmen and enginemen and by repeated efficiency tests, impressed upon the employees the necessity of strict observance of these rules. The crew of train No. 25 was provided with both caution and stop fusees, neither of which were used either to space or to stop the following train. The conductor, the flagman and the baggagemen of train No. 25 all testified that it would have been easy for them to have used a fusee, and had one been used it would have been seen by the engineman of the train following. The conductor testified that he had instructed the flagman to look out for train No. 3, but his testimony showed that he did not follow this up to see that his in-

structions were carried out. Only after the train stopped did any member of the crew concern himself with No. 3. The testimony showed that the atmosphere was clear and the temperature somewhat above freezing. The engineer of No. 3 while following closely No. 25 on long stretches of straight track between Effingham and Kinmundy, states he did not at any time see the tail lights of No. 25, though he admitted that such lights could normally be seen at a distance of four or five miles. The crew of No. 3 admitted there were bulletin instructions posted restricting the speed of all trains through Kinmundy to ten miles an hour. The engineman of No. 3 testified that he had made a light service application to the brakes to reduce the speed for Kinmundy and had almost immediately discovered his proximity to train No. 25. Whereupon he made emergency application of the air brakes but too late to avoid the collision. The board on personal observation on the night of January 23 could be seen for at least one mile. The equipment of No. 3 was all perfect.

James Theodore Harahan had been president of the Illinois Central for five years, and an officer of the road for 20 years when he was retired under the rules of the pension system on January 12, 1911, on his seventieth birthday, and was succeeded by C. H. Markham. He had already made a notable record as an operating officer when he came to the Illinois Central, November 1, 1890, as second vice-president; but his reputation was made by planning and executing the handling of the enormous World's Fair traffic at Chicago in 1893. For 16 years he was the real executive officer of the road, with jurisdiction over both the operating and traffic departments, while President Fish maintained his office in New York. During the period the Illinois Central increased its mileage from 2,799 to 4,374, not counting the Yazoo & Mississippi Valley with its 1,210 miles.



F. O. Melcher.



E. B. Peirce.

were able to see the tail lights of No. 25 under conditions similar to those on the night of January 21 from a point two miles north of Kinmundy, also at all intermediate points. In view of this and other related testimony the board of inquiry finds that the conductor and the flagman of No. 25, knowing that No. 3 was following closely, were negligent in not using the means they had in protecting their train. The board also finds from this and related testimony that the engineman of No. 3 was negligent in not discovering earlier his proximity to No. 25."

The report was signed by all the members of the board. The engineman had been in service 25 years, 16 years on this division. He was not regularly in passenger service, but had made several trips extra. The towerman at Kinmundy Junction stated that after No. 25 stopped he threw the distant signal to caution position. This signal was 809 ft. north of the rear of No. 25, and

In November, 1906, he was elected president, following the memorable contest between Stuyvesant Fish and E. H. Harriman for the control of the road.

Mr. Harahan was a man who always kept closely in touch with the details of the management of his road, and was a tireless worker. During his administration the Illinois Central was regarded as a highly successful property and a well-managed road. Its reputation was marred only by the car repair graft scandal which was exposed during 1910 by investigations instituted by Mr. Harahan.

Mr. Harahan was born at Lowell, Mass., January 12, 1841, and began railway work in 1864 at Alexandria, Va. Until 1872 he was employed in various capacities consecutively with the Orange & Alexandria, the Nashville & Decatur, the Louisville & Nashville, and the Shelby Railroad. For seven years he was

roadmaster of the Nashville & Decatur, now part of the Louisville & Nashville, and in 1879 went with the latter road as superintendent of the Memphis line. He was then made superintendent of the New Orleans division; was general superintendent of the road south of Decatur, Ala., from December, 1883, to July of the following year, and was then for six months general manager of the entire line. From January to April 1, 1885, he was general superintendent of the Pittsburgh division of the Baltimore & Ohio, and on the latter date returned to the Louisville & Nashville as assistant general manager. He was again made general manager in October, 1885, which office he held for three years. From October, 1888, he was consecutively, assistant general manager of the Lake Shore & Michigan Southern, general manager of the Chesapeake & Ohio, and general manager of the Louisville, New Orleans & Texas, going to the Illinois Central as second vice-president on November 1, 1890. In 1906 he was elected president of that road, the Indianapolis Southern and the Yazoo & Mississippi Valley.

Frank Otis Melcher was born June 14, 1864, at Damariscotta, Me., and graduated from Tufts College in 1887, receiving the degree of civil engineer from the same school in 1895. The year he graduated he began railway work on the Fitchburg Railroad as an instrument man, and was later appointed assistant engineer and then chief engineer of the same road. He was appointed division superintendent in 1897; was promoted to general superintendent the following year, and from July, 1900, to November 1, 1902, was superintendent of the Fitchburg division of the Boston & Maine, which had taken over the Fitchburg. On the latter date he went to the Chicago, Rock Island & Pacific as superintendent of the Illinois division, was made general superintendent of the Choctaw district in February, 1904, and in June of the following year was made general manager of the Central and Northern districts. His jurisdiction as general manager was extended over the entire system of the Chicago, Rock Island & Pacific in December, 1906, and on the dissolution of the Rock Island-Frisco system in December, 1910, he was elected second vice-president in charge of the operating department of the Rock Island, succeeding H. U. Mudge, who was elected president.

Edward B. Peirce was born August 14, 1868, at Kosciusko, Miss. He was educated at the University of Mississippi, and in 1890 began railway work as assistant to the general solicitor and attorney for Arkansas of the Choctaw, Oklahoma & Gulf. When that road was absorbed by the Rock Island in 1904 Mr. Peirce was made attorney for Arkansas of the Chicago, Rock Island & Pacific, and in October, 1906, was promoted to commerce counsel of the Rock Island and the St. Louis & San Francisco, with office at Chicago. When the dissolution of the Rock Island-Frisco system took place in December, 1909, he was made general solicitor of the Rock Island.

Eldridge E. Wright was a prominent lawyer in Memphis, besides holding the office of attorney for Tennessee for the Rock Island. He was a son of General Luke E. Wright, former Secretary of War, and was a part owner of the Memphis *Commercial Appeal.*

President Markham of the Illinois Central after the accident gave out the following statement: "The unfortunate accident which resulted in the death of James T. Harahan, our late president, F. O. Melcher, E. B. Peirce and E. E. Wright at Kinmundy, Ill., early this morning has inexpressibly shocked the officers and employees of the Illinois Central Railroad Company from the highest to the lowest and they extend to the families of the dead their most profound sympathy on the irreparable loss which they have sustained."

The Bolivian chamber of deputies has authorized the federal government to obtain estimates and bids for the construction of a railway 108 miles long from Quiaca, on the northern boundary of the Argentine republic, to Tarija, Bolivia. The government will guarantee interest on the money invested in construction at the rate of 5 per cent. per annum.

OTIRA TUNNEL IN NEW ZEALAND.

In the South island, New Zealand, construction is proceeding on a railway to connect Nelson, on the northern coast, with Reefton, about 100 miles to the south, which is already connected by a railway of 47 miles with Greymouth, the leading west coast port, and the center of a rich gold, coal and sawmilling district. Also Greymouth is to be connected with Christchurch, the largest city of the South island. There is now a railway from Christchurch 72 miles westward to Cass, and from Greymouth a railway 51 miles eastward to Otira, in the Otira gorge. Connecting Cass with Otira will therefore connect Christchurch with Greymouth. This connection necessitates a 5⅓-mile tunnel, piercing the Southern Alps. I recently witnessed construction work at this tunnel, which it is estimated will cost over $3,500,000. There is a grade in this tunnel of 1 ft. in every 33 ft. upward from the west coast side, which makes it difficult to keep water out of the eastern end, even with pumping, so that work at this end must necessarily be much slower than at the other end, where the water will easily drain out. From the western side at Otira, in company with the engineer for the work, I went 1½ miles into this tunnel—as far as completed. We were taken in on a train of trucks loaded with concrete, drawn by an American electric locomotive fed with current from an overhead wire. During the last quarter of a mile, where considerable work is going on and the passage is only partially excavated, it is unduly dangerous to have live wires in the tunnel, so use is made of an ingenious contrivance of an insulated cable wound up on the locomotive, which is made to connect with the trolley wire, and spins out as the locomotive goes on its course, the current being received through this cable and applied to the locomotive, so it continues its uphill course through the tunnel without endangering human life. This interesting locomotive is much used, I understand, in tunnel work and mining operations in the United States, where the engineer in charge, who was formerly employed on the Western Pacific Railway, had occasion to notice its usefulness, and so introduced it into New Zealand. All the rock building in the tunnel is worked by compressed-air machinery, which is also of American manufacture. Early in the construction of the tunnel, when an accident imprisoned some of the men for about 80 hours, this American machinery pumped fresh air and food into the prison chamber, so that when the men were finally rescued they were little the worse for their trying experience. Work on the tunnel is proceeding on the same general plan of top headings as in the Simplon tunnel in Switzerland, the top first being cut out, then the bottom, and then all sides trimmed off and finally arched with concrete. The work at the western end now proceeds at the rate of about 12 ft. per day. It has been going on for about three years and may require about five years more to complete. A small water-power plant near the western end drives the machinery, but recently it seems that dry weather has reduced the power below necessary requirement and so interfered with the work.

The electrification of this tunnel will be an interesting and necessary future development, for without electrification the smoke of engines puffing up the heavy grade would make the air somewhat stifling. It is possible that electric power for this purpose will be obtained from some nearby waterfall, or possibly electric power from the Lake Coleridge scheme, near Christchurch, on which the government is just about to begin work, will be transmitted. The opening of the Otira tunnel will have a most important economic influence on the development of the South island of New Zealand. The tunnel will require 50,000 cu. yds. of concrete construction. It is 14 ft. wide at the rail level. The total height is 16 ft. 9 in., though about 4 ft. at the top will include concrete arch and also some hollow space between that and the natural rock. It is being constructed under contract by McLean & Company, Wellington, under supervision of engineers of the public works department of the New Zealand government. —*Consular Report.*

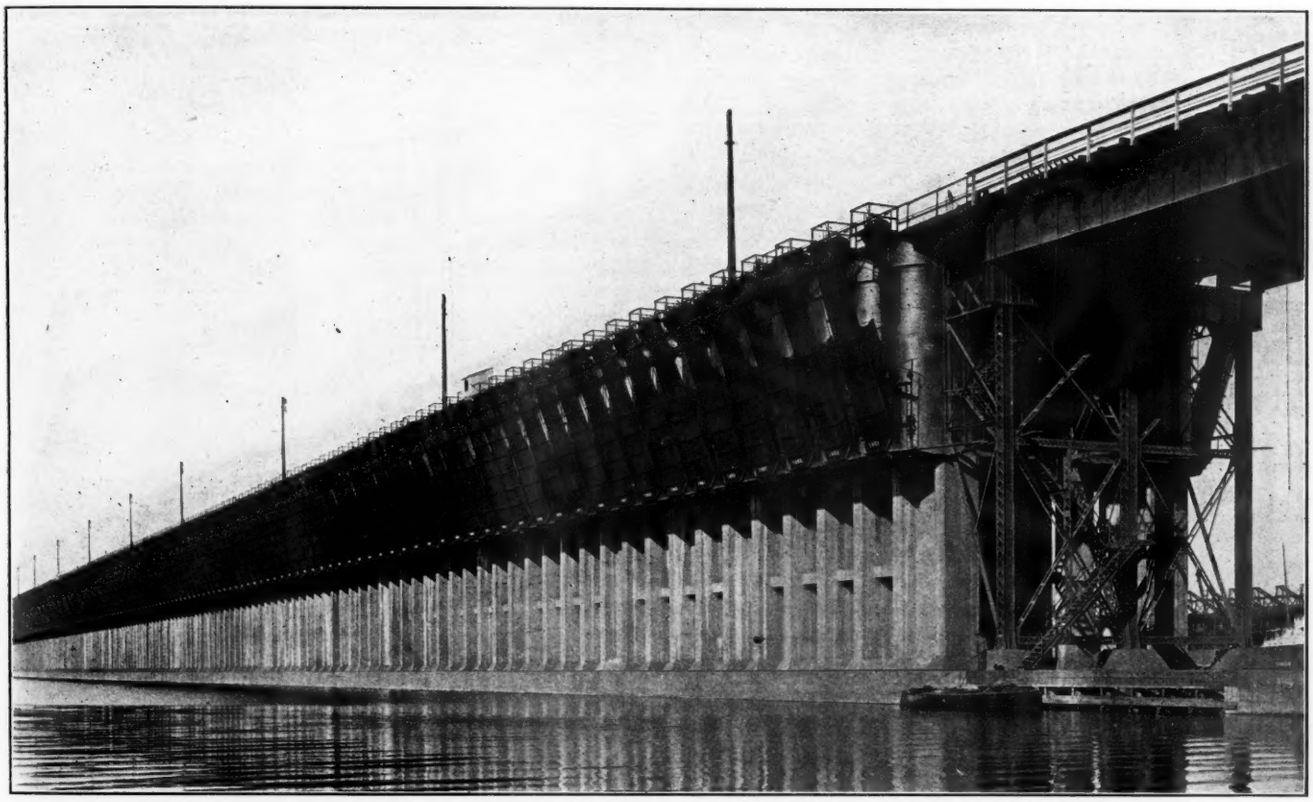
GREAT NORTHERN ORE LOADING DOCK AT ALLOUEZ, WIS.

The Great Northern has steadily extended its ore lines until they now reach all the important points on the Mesabi range. According to the terms of the Hill ore lease, the company is assured a very heavy tonnage from the Steel Corporation mines for at least the next three years. The minimum tonnage specified in the lease is to be 4,500,000 tons in 1912 and 5,250,000 tons in 1913. In addition to this, a considerable tonnage is also handled from the mines of independent companies on the range.

In order to care for the loading of this ore the company last year placed in service a new steel and concrete dock at its terminal on Allouez Bay, near Superior, Wis., which is the largest ore-loading dock of its kind on the lakes. It is 1,900 ft. 7½ in. long from end to end of the cribs, and contains 151 pockets on each side, built to the standard spacing of 12 ft., making the distance between centers of the end bin walls 1,812 ft. The base of the rail on the structure is 75 ft. above mean water level, and the width on the top of the dock, exclusive of machinery platforms, is 62 ft. 6 in. Each bin has a capacity of 325 tons and is designed to hold seven 46-ton carloads of ore, although in actual operation only six carloads are usually dumped in one pocket. This gives the dock a total storage capacity of 98,150 tons. A loading dock is built primarily, however, as an ore-handling machine rather than a storage bin, and the records already made in handling ore prove that this one is among the most efficient loading docks on the lakes. Soon after its completion 9,500 tons of ore were loaded into a single vessel in 25 minutes, and a short time later eight vessels with an aggregate tonnage of 62,000 tons were loaded in six hours, an average rate of 10,344 tons an hour. The size of the dock allows six of the largest ore boats to be loaded simultaneously.

In structural details a number of unique features are presented. The familiar steel trestle supporting the pockets has been entirely eliminated, and in its place massive concrete columns or piers, without transverse bracing, are used. No longitudinal girders are provided at the tops of the supporting columns, the load on the tracks being carried by stringers to the panel points and the load on the bin floors being carried by longitudinal purlins to web plates connecting the vertical columns in the partition walls. These web plates make the partition walls act as transverse beams spanning between the concrete columns and carrying the load on the dock. One of the most striking features about the construction is the use of curved steel plates for the ends of the pockets. This design has the double advantage of being entirely self-supporting and of materially aiding in breaking up the arching of the ore in the pocket which seriously retards its flow.

The dock is approached by a long timber trestle and 300 ft. of steel trestle. The latter consists of three towers supporting 32 ft. 6 in. tower girders and 62 ft. 5½ in. intermediate girders. The grade is continuously ascending toward the dock, being 0.52 per cent. to the outer bent of the third tower of the trestle approach, 0.43 per cent. over the third tower, 0.176 per cent. over the last intermediate girder, and level over the dock proper.

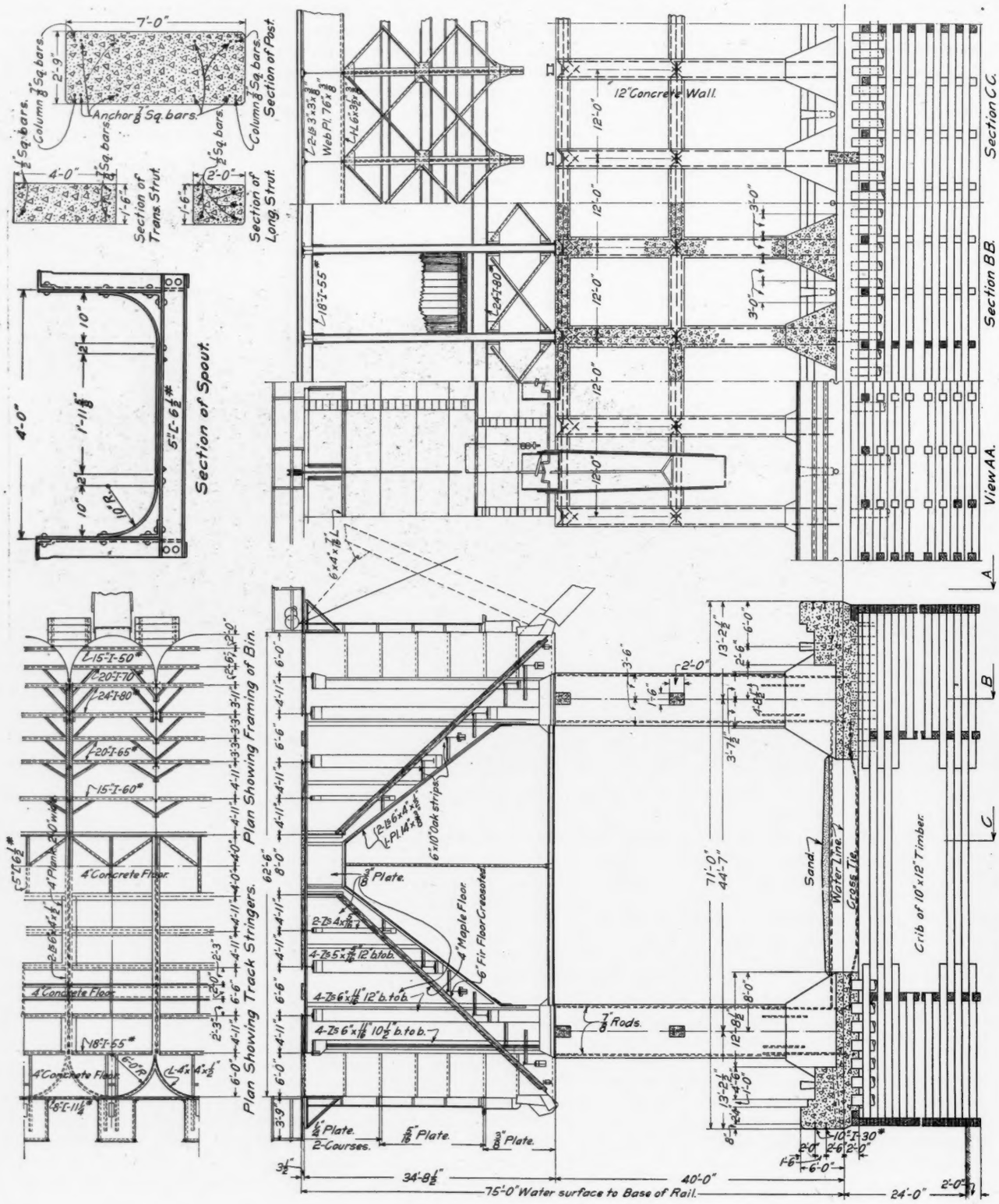


General View of the Great Northern Ore Dock at Allouez, Wis.

The foundations under the entire structure are carried on piles, the dock being supported on two parallel timber cribs carried down to 20 ft. below water level, or 2 ft. below the bottom of the slip. The piles in these cribs are driven in transverse rows, 7 piles in a row, spaced 2 ft. 6 in. between piles and 2 ft. 4¾ in. between rows. The cribs are framed of 10-in. x 12-in. timbers, each crib being 16 ft. in inside width. The outer walls of the cribs are of solid 12 in. x 12 in. timbers made permanently sand-tight, the cracks being stopped where necesessary by 1 in. x 4 in. pieces nailed on the inside. The inner walls of the cribs are open and the entire space between the two outside walls is filled with sand. At intervals of approximately 28 ft. 9⅝ in. the two cribs are tied together with four 10-in. x 12-in. timbers, two at the top and two at the bottom. Each course of timbers is drift-bolted to the course below, and cross-timbers are dovetailed into the outside walls. The piles are cut off 1 ft. below water level, and are capped by continuous longitudinal concrete slabs carried down 1 ft. below the top of the piles. These slabs

are 3 ft. thick under the column pedestals and 8 ft. thick at the outer edge, where they are designed to form copings. The face of each slab is protected from contact with the boats by two 10-in., 30-lb. I-beams set flush with the surface. Drainage over these slabs is provided by sloping the upper surface of the concrete between the columns 1 in. in 16 ft. and by providing a 6-in. drain hole through the coping.

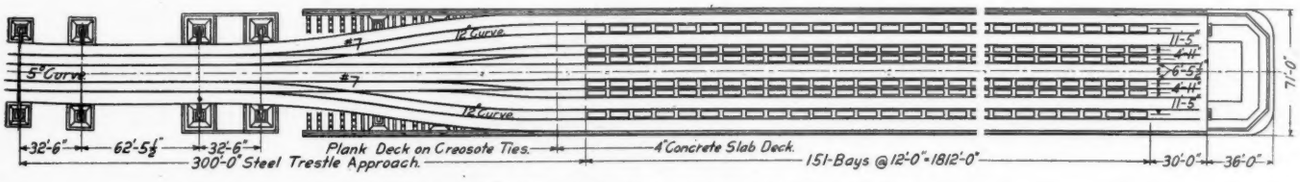
The pedestals under the concrete columns are 7 ft. high above the surface of the slabs, and the columns are 31 ft. 10 in. high above the top of the pedestals. The columns are 7 ft. x 2 ft. 9 in. in cross-section reinforced by ⅞-in. square bars near each corner, designed solely to protect the corners against injury. The slabs and pedestals are of 1:2:5 concrete and the posts of 1:2:4. The columns are connected longitudinally by two sets of concrete beams, each 2 ft. deep and 1 ft. 6 in. wide. The upper row of beams is flush with the top of the columns and the lower row 14 ft. 11 in. above the top of the pedestals. These longitudinal struts are reinforced by 8½ in. square bars, which are carried into the columns at either end of the struts and turned up to secure a firm bond. The structure is further stiffened by 16 tower bays, the piers of every tenth bay being connected by a 10-in. concrete wall. In these bays the reinforcing



Typical Cross Section and Details of Construction of Great Northern Ore Dock at Allouez, Wis.

steel used in the longitudinal struts is placed in the same position that it would occupy if the struts were used in that bay. Expansion and contraction is provided for by 15 expansion bays spaced every tenth bay, the joint in the longtitudinal foundation slab consisting of two inches of tarred box board.

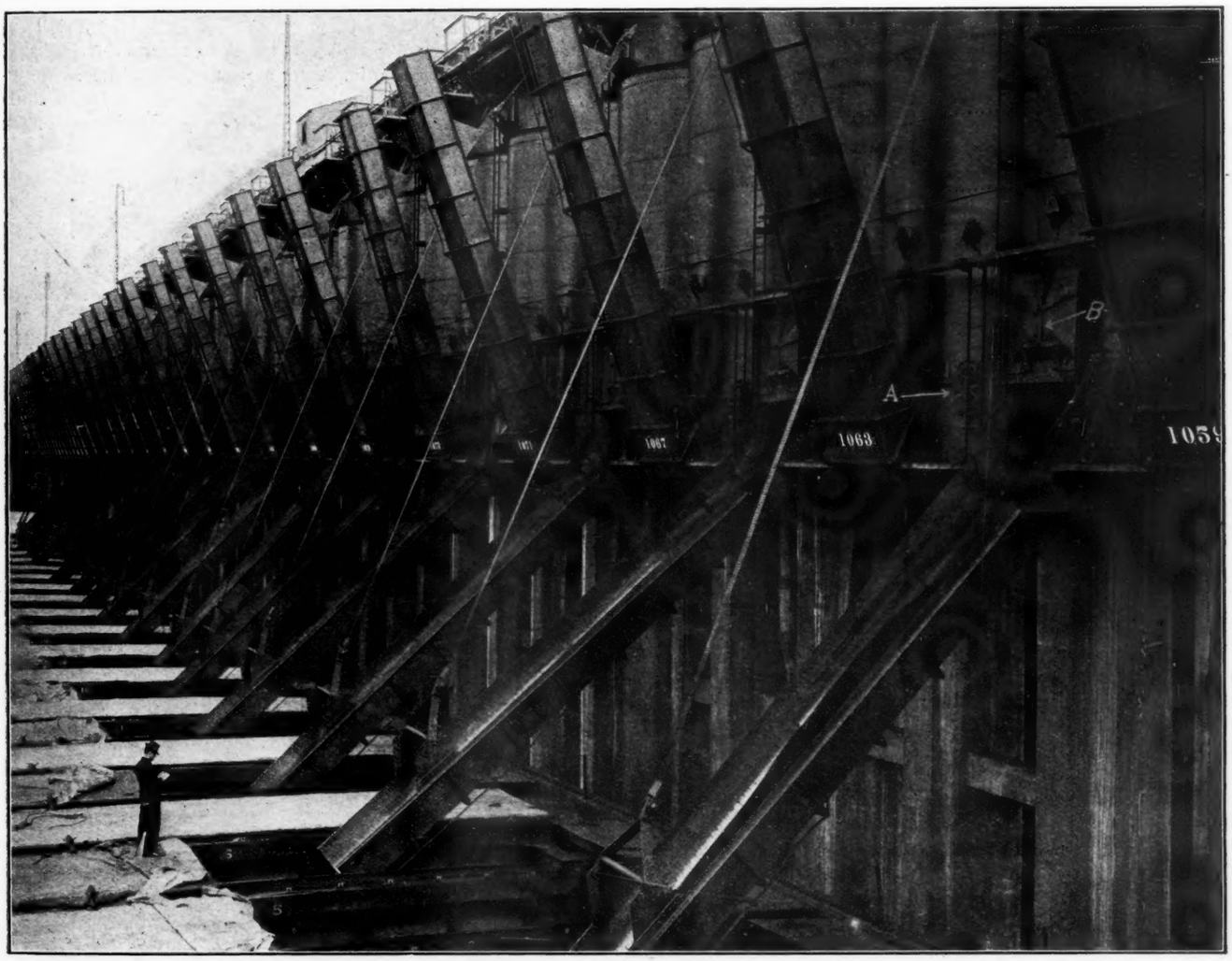
The vertical struts under the dock tracks are built up of Z sections. The two struts over each concrete column are made up of four 6 in. x 11-16 in. Z bars, the two inner struts being four



Plan of the Great Northern Dock at Allouez, Wis.

5 in. x 5-16 in. Zs and two 4 in. x 5-16 in. Zs respectively. The inner rail of the inner track over each pocket is carried on a longitudinal plate girder, built up of two top flange angles, 3 in. x 3 in. x ⅜ in., a ⅜-in. web plate and one 6 in. x 3½ in. x ⅜ in. lower flange angle. This plate girder and the struts in each partition wall are connected by continuous ⅜ in. plates, spliced by 6½ in. x ⅜ in. vertical plates. This plate is stiffened along its lower edge by two 6 in. x 4 in. x ½ in. angles. The struts are encased in concrete flush with the backs of the Z bars, making the surfaces of the partitions smooth. Seven I-beam purlins connect these bin walls and directly support the pocket floors. The plates at the points of connection of these I-beams are stiffened by angles placed horizontally and extending out to the lower edge of the plate. The filling layer of the pocket floor is of 6 in. creosoted fir, and the surface is of 4 in. hard maple. The floor makes an angle of 47½ degs. with the horizontal, which is in accordance with recent practice in increasing the pitch in order to facilitate the flow of the ore.

The steel plates forming the semi-circular ends of the bins are placed in seven courses with riveted lap joints. The upper two courses are ¼ in. plate, the next three are 5-16 in., and the bottom two are ⅜ in. The tendency of the ore to arch in the bins has been found to be almost entirely due to the presence of the square ends, the arch usually forming between the face of the bin and the floor of the pocket, and very rarely between the parallel partition walls. The curved steel ends present only diagonal surfaces to the pressure of the ore, practically eliminating the arching effect. The pockets empty clean, with only 4 or 5 cu. ft. of ore remaining. The doors are of the ordinary sliding type, and are not counterbalanced. They are hoisted by

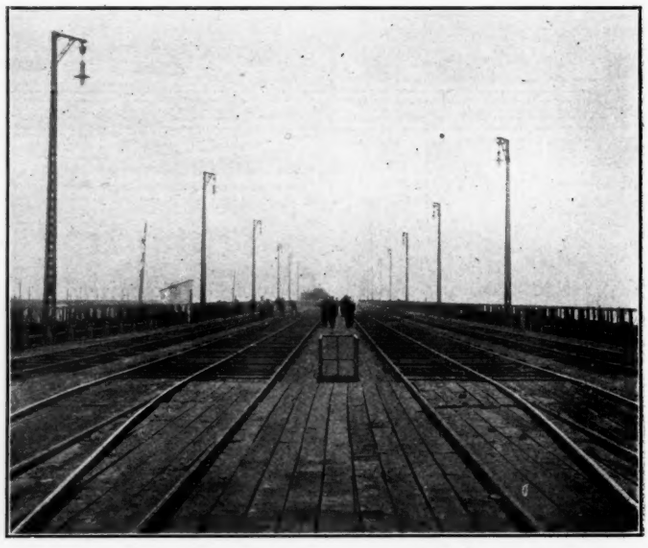


Side of Dock Showing Hand Winch (A) and Locking Mechanism (B) of the Bin Doors; also Spouts and Operating Platforms.

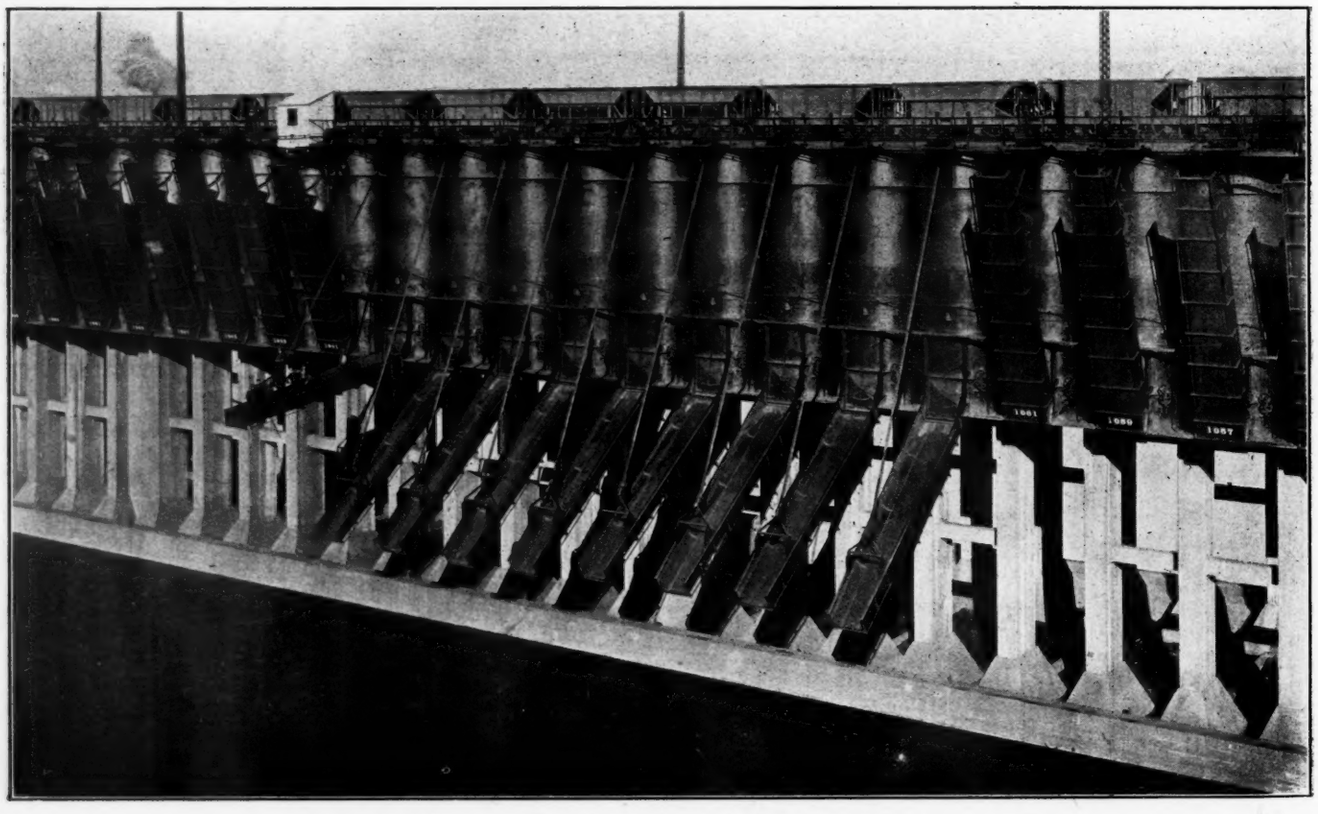
hand winches as shown at *A* on one of the accompanying photographs, the hoisting rope being attached to the latch mechanism shown at *B*. The winch is geared to hoist the door with a pressure on the handle of 35 lbs. As soon as the door is unlatched the pressure of the ore forces it out a little and the stream commences to flow. It can then be hoisted by the winch as far as desired. When in the open position the door can be prevented from closing accidentally by a safety bolt which fits in a hole milled in the cheek plate. The door is of steel plate, slightly convex outward to give it additionl stiffness. It cannot be closed while the stream of ore is flowing. The clear opening provided is about 5 ft. x 2 ft. 7 in.

The spouts are 34 ft. 6 in. long and are rectangular in cross-section with fillets of 10 in. radius in the corners. The sides and bottom are reinforced by angle bars and channels, making a very rigid construction which eliminates much of the tendency to warp and buckle which is present in the semi-circular spouts ordinarily used. The spout is 5 ft. 6 in. wide at the upper end and 4 ft. at the lower end, this taper being provided to increase the friction of the stream of ore against the sides of the spout and thereby reduce its velocity so that the impact in the hold of the vessel is reduced and the stream can be more readily controlled. The spouts are operated by electric hoists and are not counterweighted. The ⅜ in. x 5 in. flat wire hoisting rope is wound around a drum connected to an electric hoist on the machinery platform at the top of the dock. These hoists are operated in groups from a line shaft, the drum being connected to the shaft by a friction clutch controlled by an operating lever. Alternating current, 3-phase, 60-cycle, 440-volt motors of 25 h. p. capacity are used, one motor being provided for every ten spouts. The capacity of the motor allows it to handle several spouts at one time, and the line shaft is so arranged that in case the motor operating any particular group is damaged the adjacent motor can be used. Connections to the line shaft are so arranged that the spouts are lowered under control of the motor and it is impossible for them to drop suddenly.

In order to more equally distribute the ore in the pockets and to avoid trimming, three tracks are provided over each set of pockets, as shown in the accompanying plan. The four inside tracks, however, are built in two sets, each of which has one rail in common, so that it is only possible to shunt cars on four of the six tracks at one time. Floor slabs of 1:2:4 concrete, 4 in. thick, are provided outside of the outside dock rails and between the inner track rails. These slabs are reinforced by ½ in. square bars spaced 6 in. center to center, running longitudinally. A similar floor slab 2 ft. wide, reinforced with wire cloth, is provided between the outside and the center track over each pocket. The approach over the steel trestle is on a 5 deg. curve, and the turnouts to the outside dock tracks are 12 deg. curves.



Deck of the Dock Showing Track Construction, Machinery Platforms and Lighting Arrangement.



Side View of the Dock with Ore Cars on the Structure.

No. 7 frogs are used. The track construction is clearly shown in one of the accompanying photographs.

The dock is lighted by flaming arc lamps suspended on structural steel posts 35 ft. high, spaced 192 ft. apart. By the use of flaming arcs a considerable saving in the number of lamps necessary was affected, the ordinary spacing for carbon arcs being from 108 to 120 ft.

The dock was designed and built under the direction of A. H. Hogeland, chief engineer of the Great Northern, Max Toltz, of St. Paul, acting as consulting engineer. The Barnett & Record Company, of Minneapolis, Minn., were contractors for the foundation and concrete work, and Whitney Bros. for the dredging. The steel work was fabricated by the American Bridge Company and erected by the Pittsburgh Construction Company. The spouts were built by the Minneapolis Steel & Machinery Company, Minneapolis.

HEAD END ELECTRIC TRAIN LIGHTING.*

BY C. R. GILMAN,
Chief Electrician, Chicago, Milwaukee & St. Paul.

A head end lighting system is one where a steam turbine driven dynamo is placed either on the locomotive or in the baggage car, taking steam from the locomotive to operate it. Auxiliary lighting is maintained, when locomotives are changed or cars stand in terminals, by two, three or four storage batteries, depending on the number of cars in the train. These batteries float on the main train wires in parallel with the dynamo, lighting the lamps should any thing happen to the dynamo, turbine or steam hose or if the train should part and pull out a connector.

Although the general system of head end train lighting is the same as used 15 years ago, there have been a number of improvements and changes made. These, with the adoption of the new types of electric lamps, storage batteries, fixtures and reflector glassware, make this system efficient and reliable, where first-class uniform lighting is required on a heavy train.

One of the advantages of the head end system is that as far as its lighting is concerned the number of cars on the train is limited only by the number the locomotive can haul. A seventeen mixed car train is, therefore, taken as an example.

The train is made up as follows:

1 dynamo baggage car	14 lamps
2 mail cars	66 lamps
1 mail tender	8 lamps
1 Comp. sleeper	60 lamps
1 12-section sleeper	80 lamps
1 buffet car	82 lamps
5 12-section sleepers	400 lamps
1 dining car	42 lamps
1 parlor car	42 lamps
3 coaches	78 lamps
17 cars	872 lamps

EQUIPMENT.

One 25 kw. Curtis turbo-generator, 3,600 r. p. m. 110-125 volts.
Switch board and dynamo connection in baggage car.
Automatic loop connectors.
Standard 2-compartment tray of train lighting batteries.

Eight hundred and seventy-two 104-volt, 8 c. p. lamps are used and the total lamp load is 20,627 watts. The losses in the machine and the train lines is 22 per cent., so the load on dynamo is 25,219 watts, which is the full capacity of the machine. In actual operation we seldom get continual steam pressure enough to operate this load, and the storage batteries help out until the number of lights is reduced, as the passengers retire for the night.

Charging batteries en route requires plenty of current, lamp regulation, and means to determine the amount of charge or discharge the batteries are receiving. While there are a number of good automatic lamp regulators on the market, they are quite expensive and each car on the train must have one. Owing to the large number of cars required to make up this train, the cost of automatic regulators would have been over $1,700. And we cast about to see if we could not substitute some means to accomplish the desired results at less expense. Without altering or adding to the present three-wire standard we have accomplished this by connecting the battery to the same main wires as the dynamo and placing a hand operated resistance in the main lamp return wire, in the baggage car. This lamp resistance is brought into use by opening the connector loop at the rear of the train and closing it on switch in the baggage car.

In lighting a 17-car train having over 800 lamps it was found hard to keep the batteries charged and give satisfactory illumination, and on account of the heavy all night load of 75 amperes. I therefore suggested that we reduce the load on this train by adopting 60 volts, and using tungsten and tantalum lamps; this was tried out on the Pioneer Limited. On November 10, 1910, this train arrived in the yard at 11:00 a. m., and when it left at 5:30 p. m. the 110-volt system had been changed to 60 volts and the train had been lamped and tested. The operation that night was all that was expected and the lighting was beyond reproach. To convert the 110-volt dynamo into a 60-volt machine, we placed an extra field rheostat in series with the old one and a shunt across the compound field terminals. The cost of converting this machine from 110 to 60 volts was $7.50.

Compared with a test of a 104-volt train the amount of steam required to operate the dynamo averaged about 18 lbs. less, and the battery charging current available was 50 per cent. greater. The voltage was more uniform, 12 c. p. lamps being used instead of 8 c. p., which increased the light on train 60 per cent. In comparing the operation costs of the two systems, the following items should be considered:

Consumption of steam.	Lamp renewals.
Weight hauled.	Yard labor.
Battery depreciation.	Total candle power.

110-VOLT TRAIN.

The average load on this train was 14.96 k. w. Taking the tests made by Mr. Wray, published in Bulletin No. 268 of the University of Wisconsin, for the efficiency of the turbine, it is found that at a load of 15 k. w., 88 lbs. of steam were used per k. w. hr., which for 19 hours gives 25,080 lbs. of steam used per trip. This divided by 5.5, the pounds of water evaporated per pound of coal, gives 4,560 lbs. of coal used per trip, which multiplied by 182, being the number of trips per year, equals 829,920 lbs. of coal, costing $830.

There were four sets of batteries carried, each set having 54 cells, which together weighed 18.68 tons. This multiplied by the mileage gives 2,787,803 ton-miles, and at a charge of .0015 cents per ton-mile gives a cost of $4,181.70. The battery depreciation figured at 15 per cent. amounts to $679.40. The yard labor was $554.80. There were 5,232 carbon lamps used which, at a cost of 20 cents each, amounts to $1,046.40.

60-VOLT TRAIN.

The average load on this train was 10 k. w., and the average amount of steam used was 105 lbs. per k. w. hr., which figured on the same basis as the 110-volt train, gives the cost of coal as $660. Four sets of batteries having 32 cells each were hauled at a hauling cost of $2,503.80. The battery depreciation of this set amounted to $403.20. While there are 20 per cent. less batteries to be handled in the yard the other work on the train remains the same, so 65 per cent. of the yard cost of the 110-volt train was estimated to be sufficiently accurate. This amounts to $360.12. On this train tungsten and tantalum lamps were used at an average cost of 47 cents per lamp. Ten per cent. more lamps were used than on the 110-volt train, which makes their cost $2,704.85.

The cost of the 110-volt train is therefore $7,292.30, while that of the 60-volt train is $6,631.97, which gives a saving of $660.33 in favor of the 60-volt system. Although the difference in operating expense is not very large, the lighting service was about 100 per cent. better. The total candle power of the 110-volt train was 6,976, while that of the 60-volt train was 10,464, and this increase in candle power has greatly reduced the operating troubles, for formerly reports were constantly received of poor lighting, where as with the 60-volt system very few reports of this kind have been received.

*Abstract of paper read at the meeting of the Western Railway Club, Chicago, January 16, 1912.

NASH'S DUPLEX PASS FORM.

C. L. Nash, auditor and general freight and passenger agent of the Interstate Railroad, Big Stone Gap, Va., in revising his pass forms to make convenient a proper compliance with the new regulations of the Interstate Commerce Commission, has devised a duplex form. The front page is shown slightly reduced, Fig. 1 (pass No. 300, filled out but not signed). Stubs both for the going portion and the return, are printed on sheets of exactly the same size and folded (at the top) so as to lie beneath the pass and be filled out with the pass, at one writing, by means of carbon paper. The top fold is used as being the most convenient for insertion in the typewriter. The going portion of the pass, Norton to Blackwood, bears on its back the following: "If not issued, or if issued and not used, send to Auditor. Date lifted ———, 191—" The back of the return portion, Blackwood to Norton, reads:

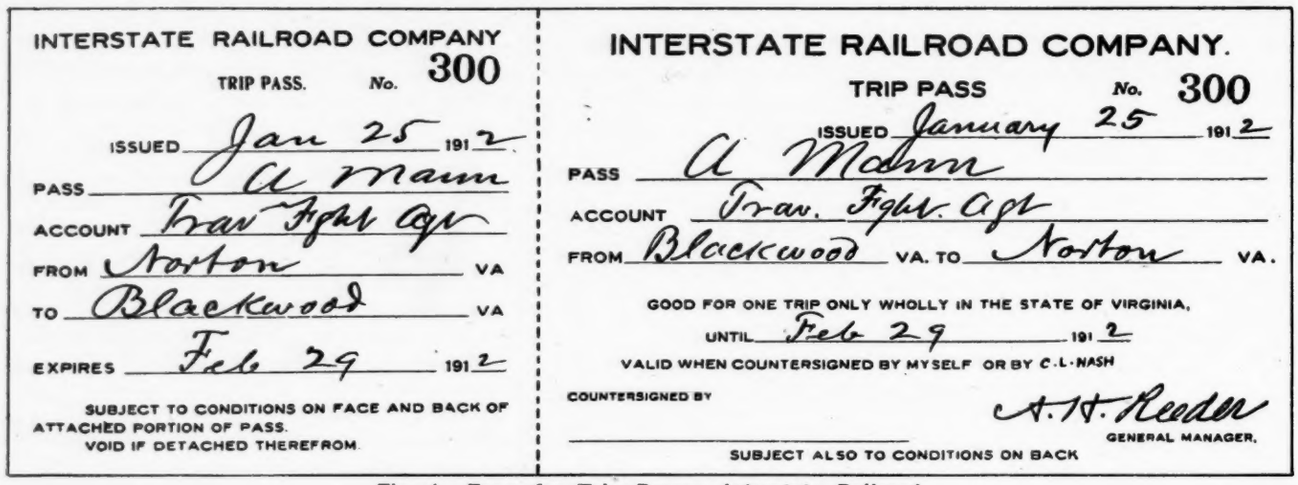
Not transferable and if wrongfully presented, conductor will take up and collect fare.
Holder is not prohibited by law from receiving this pass, and agrees it will be lawfully used.
The person accepting this pass assumes risk of accidents, injuries and damages to person or property under all circumstances, without claim on the carrier from any cause.
I accept the above conditions, and agree to return to carrier any portion of this pass not used by me.

.....
Not valid until signed in ink by holder.
Date lifted.....191...

The two stubs are virtually duplicates of each other; the left-hand one is to be retained by the officer issuing the pass, and the right-hand is for the auditor. The back of the auditor's stub reads:

User's Address .....
Requested by .....
Detach and send this copy at once to Auditor together with unissued portion if pass is one way only.
See back of issued pass for conditions under which this pass is issued.

The auditor's stubs, 5 in. wide x 3 in. high, when sent to the central office, can be filed numerically in a card index drawer, while the issuing office can retain and file the smaller stubs, either numerically or alphabetically. No stub remains in the pass book. The central office thus has to make but one index card, the card which is to be filed alphabetically; and this need only contain the name of the user and the number of the pass for cross reference to the stub received from the issuing office. Only one name card is needed for each user, as under this name an indefinite number of pass numbers may be inserted. Passes taken up by the conductors are filed by the central office numerically, with the carbon stubs.



INTERSTATE RAILROAD COMPANY
TRIP PASS. No. 300
ISSUED Jan 25 1912
PASS A Mann
ACCOUNT Trav Fght Agt
FROM Norton VA
TO Blackwood VA
EXPIRES Feb 29 1912
SUBJECT TO CONDITIONS ON FACE AND BACK OF ATTACHED PORTION OF PASS.
VOID IF DETACHED THEREFROM.

INTERSTATE RAILROAD COMPANY.
TRIP PASS No. 300
ISSUED January 25 1912
PASS A Mann
ACCOUNT Trav. Fght. Agt
FROM Blackwood VA. TO Norton VA.
GOOD FOR ONE TRIP ONLY WHOLLY IN THE STATE OF VIRGINIA.
UNTIL Feb 29 1912
VALID WHEN COUNTERSIGNED BY MYSELF OR BY C. L. NASH
COUNTERSIGNED BY
A. H. Reeder
GENERAL MANAGER.
SUBJECT ALSO TO CONDITIONS ON BACK

Fig. 1.—Form for Trip Passes, Interstate Railroad.

For a record of annual and term passes, Mr. Nash uses a card index made up of yellow cards 5 in. wide x 3 in. high, which reads:

Name.....Pass No.....
Address .....
Issued account of.....
Territory—Entire Line .....
Date of Expiration*.....
Request of .....
Date Issued .....
Remarks .....
.....

Instructions—Invariably execute this card for each Annual Pass and each Term Pass issued, and send one copy of card at once to C. L. Nash, Auditor, Big Stone Gap, Virginia. Retain one copy if desired. *Term Pass only.

This also is provided by the printer in duplicate (folded) so that the issuing officer can fill out one for himself and one for the central office at the same time. This could, of course, be made in triplicate to provide a card for a separate alphabetical card index.

Mr. Nash has devised a sheet 11 in. high x 8½ in. wide (9½ in. including a margin at the left for a loose leaf binder) for his pass stock record, this being a more convenient size than the forms for such records which are generally used. A sample of one of these stock records, reduced in size, is shown in Fig. 2 This form is used also for stock records of baggage checks, etc.

INTERSTATE RAILROAD COMPANY.

Auditor's Record of TRIP PASS Stock Received and Distributed.

STOCK RECEIVED—DEBIT				STOCK DISTRIBUTED—CREDIT				
Date	CONSECUTIVE NUMBERS		Number	Date	CONSECUTIVE NUMBERS		Number	Furnished to
	Commencing	Closing			Commencing	Closing		
1912 1/ 1	1	5,000	5,000	1912 1/ 1	1	100	100	O. Mann, G.M.
					101	200	100	B. Mann, Compt.
					201	300	100	C. Mann, Aud.
					501	1,500	1,000	D. Mann, Supt.

Fig. 2.—Record of Pass Blanks Received and Delivered.

SELF-PROPELLED CARS.*

BY W. B. POTTER,
Engineer of Railway Department of the General Electric Co.

Considering the use of self-propelled cars from the standpoint of what is usually regarded as steam railway transportation, they are of interest as providing a service costing less than with steam locomotives and at the same time increasing the traffic by offering a cleaner and more attractive mode of travel. To the passenger traffic department they offer the advantage of a service practically equivalent to the electric trolley, with the inducement to increased travel which for some not well defined reason seems to be characteristic of independent and frequent car service. The operating department will find a decreased expense for labor, as at least one man less is required for the train crew than with a steam train, and in service where there is little baggage to handle, two men, an engineer and conductor, are sufficient. There will also be a decreased expense for fuel, maintenance and incidental expenses, the total of these savings annually amounting to a very appreciable item. The performance of a self-propelled car, in the interest of its reliability and economic operation, warrants a careful study of its essential features, on the part of those handling it.

Within the limits of our present knowledge, steam storage batteries and the internal combustion engine are the types of motive power entitled to consideration. Steam passenger motor cars fit into the regular steam railway organization from the standpoints of operation and maintenance, and granted sufficient boiler capacity to give them the required schedule speed, there is undoubtedly a field of service for which the steam car is suitable. The motive power equipment of the Rock Island and the Lackawanna steam motor cars, was designed by C. J. Mellin and is a type of equipment comparable to that of the highest development of steam locomotives. A description of the Rock Island car is given in the *Railway Age Gazette* of September 18, 1908. Oil is used for fuel, the steam is superheated and the engine is cross compound. It is doubtful whether, within the dimensions, a steam equipment of greater capacity could be constructed. The inference from the limited extent to which steam-driven cars have been utilized is that they do not fully meet the requirements of independent car service.

The storage battery as a portable form of energy for electric motors, offers a very simple type of equipment and one that is particularly suitable for motor car operation within certain limits as to schedule, speed and mileage between available opportunities for recharging and for light cars. To perform economically a service demanding cars weighing 40 to 50 tons, and often hauling trailers, capable of a maximum speed of 60 m. p. h., and making 150 to 200 miles for the round trip, is a very different matter. It appears that the first cost, maintenance and cost of power, for the storage battery car in this class of service is in excess of that for cars driven by internal combustion engines. Facilities for recharging and the time required for doing so have also to be taken into account. The storage battery and internal combustion engine equipment each has unquestionably its legitimate field of operation and where these fields overlap, the selection will naturally be governed by local conditions.

The internal combustion engine utilizing gasolene as fuel has thus far been the most successful type of motive power for self-propelled cars and is in more general use than any other form of car. The Strang car, described in the *Railway Age Gazette* April 17, 1908, page 568, is equipped with both the internal combustion engine and the storage battery. The addition of the storage battery does not permit using a smaller engine, as the engine without aid from the storage battery must be able to drive the car continuously at full speed. Considering the battery as supplementing the engine to develop greater tractive effort, this result can more economically be obtained without the battery by lowering the voltage and increasing the ampere output of the generator. The battery does afford a means for moving the car without the engine and also provides a simple method of starting the engine. These minor advantages are more than offset by the increased cost, weight, maintenance and greater fuel consumption because of the less efficient method of control as compared to simply an electric generator with a variable voltage control.

The type of equipment developed by W. R. McKeen and the gas electric motor car of the General Electric Company, both use gasoline engines and are the two types more generally used in this country. A description of the McKeen car was given in the *Railway Age Gazette,* January 15, 1909, page 110, and the General Electric car has been described several times. The essential difference between the McKeen motor car and the gas electric car is in the method of control and type of transmission between the engine and the driving wheels. The McKeen car has a mechanical drive with speed change gearing, and as such it is exceptionally well designed for the purpose.

The electric method of control and transmission, as used on the gas electric car, is solely for the purpose of utilizing the inherent characteristics of the gas engine to the best advantage and to relieve the engine from mechanical strain and shock. The control of the electric motors provides for series parallel connection, which is of itself equivalent to a two to one change of gear ratio between the engine and driving wheels, and supplementing this connection there is obtained by regulating the generator voltage an equivalent change of gear ratio for slow speed with a tractive effort of 12,000 lbs. or more, up to a speed of 60 m. p. h., or over, with a corresponding reduction in tractive effort. Throughout this entire range of speed and tractive effort, the full power of the engine is utilized without interruption of power to the driving wheels. The electric drive also facilitates the economical handling of the engine, as the engine speed bears no fixed relation to the speed of the car and the speed of the car may be maintained at a maximum by raising the voltage of the generator with the engine speed reduced to the minimum which is sufficient to develop the necessary power.

As there is no mechanical connection between the engine and driving wheels, the engine can be slowed or shut down without giving any attention to the control system. With the car standing still or moving, the power of the engine may be applied in either the forward or reverse direction without mechanical strain or shock. The advantage of this flexible relation between the engine and the speed of the car will be found in the decreased maintenance of the engine and in the insignificant maintenance of the electrical equipment. A man capable of handling the engine will be competent to make any minor repairs that may be required in the electrical equipment. The engine used on the gas electric car has eight cylinders, 8 in. in diameter, 10 in. stroke and at the normal speed of 550 r. p. m. will deliver 100 k. w. to the motors with some margin to spare.

A Stromberg carbureter is used, which was developed especially for this engine. The conditions required a carbureter that would work effectively on light load and respond immediately to the full opening of the throttle. This result was finally secured by combining a small and large carbureter into one, the larger one coming into action automatically as the smaller one reaches its capacity. Two Bosch magnetos are used, one for each side of the engine and the ignition system is low tension, with make and break spark plugs actuated magnetically.

The general features of the engine and its operation do not differ materially from the gasolene engines commonly used. Compressed air is used for starting. Practically no delay in starting results from shutting down the engine, as the car is in motion within three or four seconds after the engineer admits

*Abstracted from a paper read January 19, 1912, before the New York Railroad Club. Copyrighted by the New York Railroad Club, 1912. Reprinted by permission.

air through the starting valve. Thus the engine may be shut down when power is not required, and thus effect an appreciable saving in gasolene. The economy of operation, as affected by the fuel consumption, is really measured by the quantity of gasolene required for a given service, and in this respect the gasolene consumption with electric control does not differ materially from that which is required with mechanical control. The quality of gasolene commonly used is known as "painters' naphtha," and can be purchased for approximately six cents per gallon. This naphtha is even higher in heat units than the higher grades of gasolene, but does not vaporize as readily, and while it is used successfully with this engine, it would not be suitable for use in automobiles.

The electric motors on the driving truck are standard railway motors with 600-volt windings and are the same in every respect as those used on electric trolley lines. These motors are mounted on the forward truck under the engine and the disposition of weight is such that about 65 per cent. of the total weight of the car is on the driving wheels. As the voltage generated by the large engine varies from 200 to 800 volts, the current for lighting the car is supplied by a separate two-cylinder gasolene engine direct connected to a lighting generator. This small engine has also an air compressor cylinder for furnishing a supply of air for starting the large engine. Connected to the large engine is also a compressor cylinder which maintains the air pressure once the large engine has been started.

The cars are equipped with both straight and automatic air brakes, the latter for the purpose of handling trailer cars. The engine compartment in the forward end is about 12 ft. long, and in dimensions and arrangement is the same on all cars regardless of the remainder of the car body, which may be arranged in any way desired. A 70-ft. car, with stops every 2 miles, could maintain a schedule speed of about 25 m. p. h. The maximum speed on level track would be about 60 m. p. h.

From available data the following comparison has been prepared on the cost of operation by steam, including a locomotive and two cars, and gas electric cars on the basis of the same daily mileage. The run consisted of 150 miles daily (except Sunday) amounting to 3,900 miles a month.

	Steam Train per Mile.	Motor Car per Mile.
Wages of Crew—		
Engineer or motorman	$.0400	$.0400
Fireman	.0240	.....
Conductor	.0280	.0280
Baggagemaster	.0183	.0183
Total wages of crew	$.1103	$.0863
NOTE.—Based on no overtime allowance.		
Fuel, Water and Engine Lubrication—		
Coal for locomotive, 67 lbs. at $2.25 per ton	$.0750	.....
Water for locomotive	.0050	.....
Painters' naphtha, 6 gals. at $.06 per gal.	.....	$.0360
Engine lubrication	.0025	.0050
Other Expenses—		
Locomotive repairs	$.0850	.....
Locomotive enginehouse expenses	.0250	.....
Coaches (2) repairs and expenses	.0250	.....
Gas-Elec. motor car, general overhaul	.....	$.0215
Gas-Elec. motor car, running repairs and expenses	.....	.0210
Other supplies	.0025	.0050
Superintendence	*	.0065
*For steam locomotives this is assumed to be included in items of locomotive repairs and enginehouse expenses.		
Total cost per train mile	$.3303	$.1813
Saving per train mile	$.1490	
Saving per day (except Sunday), 150 miles a day	$22.35	
Saving for 26-day month	$581.00	
Gross yearly saving	$6,970.00	

NOTE.—When no baggage and express is handled and when operation conditions will permit, the gas-electric motor car can be operated without the third man.

As an illustration of actual results obtained from the gas-electric car during the months of July, August and September, 1911, on the Minneapolis, St. Paul, Rochester & Dubuque, which has five of these cars, the following table of expenses is given. The run was between Minneapolis, Minn., to Northfield, a distance of 37.5 miles. The 5 cars made a total mileage of 39,352 miles in 92 days, occasionally hauling one or two trailers, the mileage of the trailers being 7,879 miles.

	Total.	Per Train Mile.
Total Wages of Crew	$2,249.40	$.0573
Fuel and Lubrication, Engine—		
24,944 gals. of gasolene at $.62 per gal.	1,534.20	.0391
755 gals. of gas engine oil at $.25 per gal.	189.76	.0048
Running Repairs and Expenses—		
Total running repairs, material and labor	410.36	.0104
Car cleaning, materials and labor	135.70	.0035
Other supplies	81.83	.0021
Total expense	$4,601.25	$.1172

Discussion.—The question was brought up by G. W. Wildin as to the service of such cars on branch lines with no facilities for turning the car at the end of the line either by turntable or wye; on most roads the installation of either of these facilities would be impracticable. He also questioned the expense of locomotive repairs and enginehouse expenses, as shown in the table, believing that they were much too large for the class of service handled by the motor car.

Mr. Potter replied by saying that wherever these cars have been installed it was found that a wye could be easily installed. Also that he appreciated the value of operating the cars from either end, but at the present time it had been found more logical to keep the driver at the end in which the engine was located, so that he might watch its action. Then again, by having a car operated from only one end, several additional seats were possible. Concerning the expenses of the locomotive, he stated that he was restricted to the data he had at hand and would be glad to receive any additional information which would lead to any fairer comparison between this car and an ordinary steam train. He also emphasized the increase in efficiency due to the decrease in the weight of the car per passenger.

In replying to W. J. Harahan's question as to the reliability of the car, Mr. Potter stated that only once had he known of any car having to be drawn into its terminal under any other except its own power.

MINNESOTA REPORT ON ODESSA COLLISION.

The report of the Railroad and Warehouse Commission of Minnesota on the collision at Odessa, on the Chicago, Milwaukee & St. Paul, December 18, is in substance as follows (for other details see our report last week, page 84):

The commission has carefully considered the report filed by its engineer and the facts disclosed at the investigation. The accident happened at 4:25 a. m. at Odessa. Eastbound passenger train No. first 18, known as the "Columbian," was standing on the main track in front of the station when train second 18, (carrying no passengers) ran into it. The engine of second 18 forced itself under the west end of the sleeper "Beverly," thereby acting as a wedge sufficient to tilt its east end down, and, at the same time, force it under the connecting dining car. This resulted in the telescoping of the sleeping car, when ten persons were killed and eighteen injured.

The evidence proves that the collision resulted from violation by the employees of the rules of the company, and also neglect on the part of the company in seeing that its rules are observed. The report here quotes the rules of the manual block system, which is absolute, for following trains, "except when the train despatcher authorizes the use of permissive card or caution signal. . . ."

Nine men violated the rules and eight contributed in a greater or less extent to the accident.

The manual block section extends from Junction Switch east to Appleton, a distance of 20.6 miles. Odessa is about 5 miles east of Junction Switch. Two signalmen are maintained at Odessa, but no operator is at the tower from 1:30 a. m. to 8:00 a. m. When the operator vacated his place at 1:30 a. m. he negligently left the signal at "stop."

When first 18 arrived at Odessa at 3:52 a. m. the engineman found the signal against him and stopped about 900 ft. *east* of the

block signal. He then backed the train to a point which brought the rear end 300 ft. west of the block signal, without first waiting for back-up signals or being assured that the rear end was protected, as required by the rules. It cannot be said, however, that the action of the engineman contributed to the accident.

If the conductor and rear flagman had observed the ordinary precautions for protecting the train there would have been no danger in making the stop. The rear flagman failed to protect the rear or to throw the switch to the passing track, as ordered by the conductor, and the conductor failed to see that the flagman performed his duty, although he had thirty-three minutes in which to do so. He says he told the brakeman to throw the switch and go back and flag the train (second section) and then admits that he saw him pass the switch without throwing it. It is evident that both of these men were relying too much upon the block at Junction Switch to protect the rear.

Second 18 arrived at Junction Switch at 4:08 a. m. The conductor . . . asked the operator for a clearance, and got it, after the operator had wired to Appleton twice and, according to his statement, had received word that first No. 18 was coming close. The operator was also advised by the despatcher at Aberdeen that the passenger train was coming close to Appleton and was ordered to issue a clearance for second No. 18. The conductor, knowing these facts, accepted the clearance and proceeded with the train, being reasonably sure that first No. 18 would soon pass or had already passed through Appleton, and that no other train was in the block. The train despatcher did not order a permissive card, as provided by Rule 32, and hence the clearance given by the operator at Junction Switch, upon the instructions of the despatcher, was a clear violation of that rule. The conductor should not have proceeded upon the clearance. The operator at Appleton denies that he said that first No. 18 was coming, or coming close, and testifies positively that he reported to the contrary. The weight of the evidence according to the report [report of the commission's engineer?] is against his statement.

The despatcher, the operator at Junction Switch and the conductor of second No. 18 knew that they were violating the rules. The practice of violating rules on the part of the employees, taken in connection with certain admissions made at the hearing, shows that the railway company should be charged with knowledge that its rules are frequently disobeyed, and the commission cannot refrain from condemning this condition.

The block section at this point is the longest one on the Milwaukee system. It is too long for practical operation, and the demand for rapid service and the large volume of business done by the company makes it practically impossible to keep trains moving in the same direction over twenty miles apart. This fact persuades the employees to "take a chance," and has a tendency to cause men in authority, and the officers, to wink at violations of the rules when they have no disastrous results. The interest of the public, as well as of the stockholders of the companies, requires absolute fidelity to rules, and if this practice can be developed it will result in a very substantial reduction in the loss of life and destruction to property. Where it can be shown that a company permits the violation of rules which result in injury to person or property it should be held strictly responsible.

The report here considers the behavior of the cars when the collision occurred and discusses the question of steel car construction. This part throws no light on the subject, and therefore we omit it. An illustrated account of this feature of the wreck was given in our last issue, page 84. Continuing, the commission says:

The commission is of the opinion that a number of the employees were guilty of gross criminal negligence and recommends that the proper officials take such action as will insure the indictment and speedy trial of the responsible parties. This report, together with the findings of our engineer and the evidence taken will be filed with the Attorney General. . . . There should be a system of governmental inspection of the construction of cars, rails and all structural iron or steel work used in the manufacture of cars. . . . The commission withholds making any comment upon the safety of the manual block system until it has made a careful investigation. This will be done at an early period.

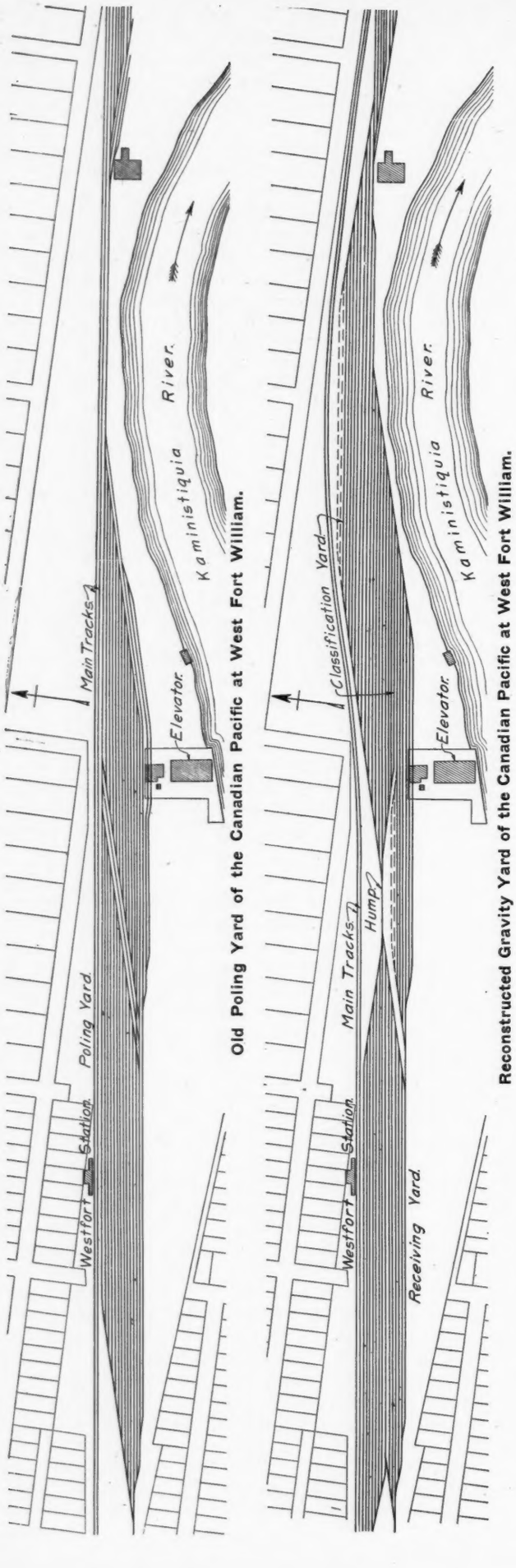
REPORT OF KENTUCKY RAILWAY COMMISSION.

The railroad commissioners of Kentucky, L. B. Finn, W. F. Klair and H. G. Garrett, have issued the annual report of the commission for the year ending December 1 last. Following a brief statistical chapter, the report deals mainly with proposed legislation. The most important litigation in the history of the commission is now in progress, the Louisville & Nashville having resisted in the courts an order of the commission making a reduction in rates for the transportation of grain. If the law, under which the commission took this action, should be held unconstitutional, it will be necessary, say the commissioners, for the legislature to immediately take action, or the beneficial power of the commission would be destroyed. However, the commission expects a favorable decision from the supreme court of the United States.

The commissioners declare that Kentucky is too conservative. She is now far behind even the most conservative of the other states in the regulation of railways. But the people have at last awakened, and a forward move should be made. To pass just now a radical and comprehensive law, like that of New York, would not be wise, and the commission contents itself with recommending a few provisions. It would like a law to impose upon railways a forfeit when they do not furnish cars promptly for loading, and the commission should have specific power to investigate complaints of lack of cars or delay in transportation; it should have power to inquire as to the efficiency of freight and passenger service; to impose penalties for not filing tariffs and to forbid unreasonable increases in rates; to order the correction of unsafe conditions of tracks or bridges, and in general to secure the convenience and safety of the public.

RECONSTRUCTION OF CANADIAN PACIFIC YARD AT FORT WILLIAM, ONT.

Largely because of the satisfactory service secured from the large gravity yard of the Canadian Pacific at Winnipeg, the poling yard at West Fort William was changed to a gravity yard during the past summer. This yard, which is used for westbound traffic only, consisted originally of 14 receiving tracks averaging about 2,000 ft. long and 14 classification tracks averaging about 1,200 ft. long, the east ladder of the receiving yard and the west ladder of the classification yard being parallel and separated by a running track. In the work of reconstruction it was necessary to make extensive changes along these ladders. The center track of the receiving yard was extended through to the classification yard and raised to form a hump. All the receiving tracks north of this were shortened by the construction of a ladder leading to the hump. To compensate for this shortening these tracks were extended at the west end the same amount they were shortened near the hump, as may be noted by comparing the two accompanying plans. Owing to restricted space, it was necessary to raise the east end of the receiving yard and the west end of the classification yard to form the approaches to the hump. The grade of the approach from the receiving yard is approximately 1.8 per cent., while on the opposite side there are 200 ft. of 3 per cent. grade, easing off to a .15 per cent. grade through the yard. To provide room for additional classification tracks, both the east and westbound main tracks were thrown north about 100 ft. and new yard tracks were laid in this space. In the new yard there are seventeen



classification tracks varying in length from 900 to 2,100 ft.

On the arrival of a train at the yard it is broken up, and any cars which may be billed through to the East by rail are taken from the classification yard to a yard further east, which is used as a departure yard for both east and westbound trains. These changes were completed and the yard put in service about the middle of September, and so far the results have been most satisfactory.

TRAIN ACCIDENTS IN DECEMBER.[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of December, 1911. This record is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd.
2.	Union Pac.	Ogden.	xc.	P. & F.	1	3
4.	Erie	Kent.	xc.	F. & F.	2	4
6.	Penn.	Manor.	rc.	F. & F.	6	3
8.	Balt. & Ohio	Clarksburg.	bc.	P. & F.	1	3
8.	Illinois Central	Paducah.	rc.	F. & F.	1	2
11.	N. Y. C.	N. White Pl's.	xc.	P. & F.	1	5
13.	Grand Trunk	W. Paris.	bc.	P. & F.	0	6
13.	Missouri Pac.	Willington.	rc.	P.	1	3
14.	Union Pac.	Castle Rock.	bc.	F. & F.	2	2
15.	Penn.	Buffalo.	xc.	P. & F.	0	4
18.	Chi., B. & Q.	Tracey, Iowa.	rc.	F. & F.	0	0
18.	Chi., M. & St. P.	Odessa.	rc.	F. & P.	10	11
21.	Chi., M. & St. P.	Glencoe.	rc.	P. & P.	0	3
22.	Texas & Pac.	Kildare.	bc.	P. & P.	1	18
23.	Erie; C. & O.	Hammond.	rc.	P. & F.	0	20
26.	N. Y., Susq. & W.	Stockholm.	bc.	F. & F.	1	3
31.	Southern	Crandall.	rc.	P. & F.	0	4

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of Train.	Kil'd.	Inj'd.
1.	Atlantic C. L.	Kissimmee.	.....	P.	1	1
1.	Illinois Central	Paducah.	d. track.	P.	0	20
6.	Southern	Helena, Ga.	d. track.	P.	2	3
8.	Chicago & Alton	Alma, Mo.	unx.	P.	0	3
11.	Southern	Pelzer, S. C.	neg.	F.	2	1
*12.	Del. & Hudson	Carbondale.	runaway.	F.	2	6
12.	Boston & M.	Wells River.	rock.	F.	2	0
13.	Trinity & B. V.	Dallas.	boiler.	F.	2	1
14.	St. Louis & S. F.	Bryant.	unx.	F.	2	2
15.	Penn.	Philadelphia.	unx.	P.	..	..
19.	St. Louis & S. F.	M't'n Grove.	unx.	P.	2	0
*19.	N. O., Mobile & C.	Stringer, Ala.	.....	P.	0	4
20.	Penn.	New Phila., O.	b. rail.	F.	1	0
20.	Del., L. & W.	Analomink.	runaway.	F.	0	1
20.	Southern	King's M't'n.	acc. obst.	P.	..	..
20.	Buffalo & Susq.	Wellsville.	b. rail.	F.	1	2
21.	Seaboard A. L.	Gloster.	b. rail.	P.	0	40
23.	Wabash	Knights.	b. frog.	P.	0	4
23.	Chi. & N. W.	Albion.	d. track.	P.	0	4
24.	Virginia & S. W.	Natural Tunnel.	acc. obst.	F.	3	2
27.	C., C., C. & St. L.	La Grange.	unx.	P.	0	15
28.	Chesapeake & Ohio	McKendree.	unx.	P.	2	5
30.	Great Northern	Sharon.	b. rail.	P.	6	13

The trains in collision at Ogden, Utah, on the 2d, were an eastbound passenger train which had just started from the station and a switching engine; and the engineman of one of the two engines drawing the passenger train was killed. The passenger train was moving at low speed, and none of the persons in its cars were injured. The switching engine had backed through a crossover so as to partially foul the main track. The men in charge of this engine were responsible for making this unauthorized movement, and a switch tender is also held negligent

[1]Abbreviations and marks used in Accident List:

rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

in giving an all-right hand signal to the passenger train before the switching engine was clear of the main line.

The rear collision of westbound freight trains at Manor, Pa., on the 6th, was apparently due to careless running by the engineman of a train running under a permissive signal, the train ahead of him having been unexpectedly stopped. The collision was not a very bad one, but the wreck, which fouled the other westbound track, was run into by a train of express cars; and in this train there was a car carrying 20 valuable horses, accompanied by a half dozen caretakers. Three of these caretakers were killed, together with one express messenger and the engineman of the express train. Ten men, altogether, were injured. Some of the cars of the express train fell down a bank 20 ft. high. The value of the horses killed was estimated at $50,000.

The rear collision near Paducah, Ky., on the 8th, was on an ascending grade. A freight train, which was unable to proceed at regular speed, was run into at the rear by a light engine which was running at the rate of 50 miles an hour. Several cars were wrecked and ditched and one brakeman was killed.

The butting collision of freight trains at Castle Rock, Wyo., on the 14th, was due to a westbound train becoming uncontrollable on a steep descending grade about 2 a. m. One fireman and one brakeman were killed and several other trainmen were injured. The eastbound train was standing at Castle Rock station, and it is said that the air brakes on the westbound train had been tested and found in good condition about five miles back. This train, which consisted of 50 cars, was brought partially under control by use of hand-brakes, but not sufficiently to avoid the collision; and it struck the standing train at about 30 miles an hour.

In the collision at Tracey, Iowa, on the 18th, a freight train ran into an empty passenger train which was being switched, near the station, damaging two passenger cars. No persons were injured. The engineman of the freight had dropped dead a few minutes before. When the freight train sounded the station whistle one mile west of the station a brakeman in the cab looked across and said to the engineman, "We head in here." This message he acknowledged, and he was at that time apparently in his usual health. A moment later both the brakeman and the fireman noticed that the speed of the train was not decreasing as it should, and then looked across the boiler head; but they were unable to see the engineman. The fireman then attempted to get in on the engineman's side of the cab, but found that the door was fastened on the inside, whether by the engineman or by the button working into a position that would hold the door, cannot be determined. As soon as this situation was discovered the brakeman crawled over the boiler head, put the air in emergency and reversed the engine; but not in time to prevent the collision. The engineman was lying on the floor of the cab, dead, the result of a stroke of apoplexy. The train had moved less than a mile from the point where it is known that the engineman was alive and acknowledged the brakeman's instructions to head in.

The collision at Odessa, Minn., on the 18th, was reported in the *Railway Age Gazette*, December 22. Ten persons were killed, and 18 injured. An eastbound express train was run into, at the rear, by the second section of the same train, carrying no passengers. The steel sleeping car at the rear of the standing train was crushed for nearly its whole length. The causes of this collision are dealt with in this issue under another head.

The derailment at Carbondale, Pa., on the 12th, occurred in the freight yard and was due to a train of 42 cars becoming uncontrollable at the head of a steep grade. The air brakes were not in operation, and after the train was separated by the failure of a drawbar, 40 cars ran uncontrolled to the foot of the grade, where the leading car jumped the track and fell against a cabin occupied by hostlers and other employees. Two of these men were killed and five injured. The wreck also set fire to a machine shop which was burnt down, and five locomotives were badly damaged by fire. A tank of gasolene was set afire by an overturned stove and several cars were burnt up.

The derailment at Philadelphia, on the 16th, was not a very bad one, but was noticeable because of its location. It was about one mile from the entrance of the Broad street station and for over an hour no train arrived at or departed from that station. The rear car of a westbound passenger train ran off the track and fell against a signal bridge, knocking it down and blocking four tracks. Access to the station was still possible over the tracks of the Maryland division, but those tracks approach from the west on a very steep grade.

The derailment near Analomink, Pa., on the 20th, was due indirectly to a freight train becoming uncontrollable on a steep descending grade. The train, consisting of 51 cars, ran off the track at a curve. Only one trainman was injured, and he but slightly. It appears that the train did not run away; but its speed increased so that the engineman applied his independent locomotive brake; and he applied it too hard and kept it on too long, so that the tires of his driving wheels became heated and loosened; and this so changed their position on the wheel centers that they spread the rails at a curve. The trainmen had manned the handbrakes and controlled the speed.

The derailment near Sharon, N. D., on the 30th, was due to a broken rail. The train was westbound, No. 3, the "Oregonian," and all the cars in the entire train, with the exception of the engine, were either partly or totally derailed; four of the passenger cars, including the diner, fell down a 20 ft. bank. One passenger, one brakeman and one cook were instantly killed; another cook and a passenger received fatal injuries; the former died in about an hour and the latter about five hours after the accident; eight other persons were injured. All of those killed, excepting one, were riding in the dining car, and apparently fell through the side windows as the car turned over down the bank and life was instantly crushed out of all except one, who was promptly extricated and removed to an officer's private car, which was on the train. All of the injured were very soon cared for in the standard sleeper and the officer's car, both of which, though derailed, were standing upright. It was about 15 below zero at the time, with a strong north wind blowing. The three persons who were instantly killed were held fast under the body of the diner and their bodies were partly burned, fire having caught in the diner and tourist car from the ranges. These cars were destroyed, together with the first-class coach, which remained coupled to them.

Electric Car Accidents.—Of the 12 accidents to electric cars reported in the newspapers as having occurred in the United States in the month of December, only one appears to have been attended by fatal results. This was a butting collision at Wolcott, Kan., on the 18th, in which two persons were killed; one the motorman of the car and the other a despatcher employed by the road. Nine passengers were injured. At Burlington, N. J., on the 19th, a car broke through an iron bridge and fell into a creek; and 11 persons were saved from drowning only by being pulled through the windows and through a hole in the roof of the car, by rescuers in boats. Near Pottsville, Pa., on the 26th, a car in which were 61 passengers fell off a bridge 15 ft. into a shallow creek, and all but three of the passengers were injured. The report said that six were fatally injured.

An American at San Pedro Sula, Honduras, has submitted a proposition to the government of that republic for the construction of a railway, which will start from some point between Punta de Hisopo and Punta Cocalito, on the Tela, and Puerto Sal Bays, and terminate at El Progreso, department of Yoro. Another proposal has been made to the government of Honduras by a civil engineer for the construction of a railway from Puerto de Tela, or Puerto de Sal, on the Atlantic, to Zacate Grande Island on the Pacific, via Tegucigalpa, or with a branch to that place from some convenient point to be selected by the concessionaire with the approval of the government. He also proposes to construct branches from points on the main line, to the boundaries of Salvador, Guatemala and Nicaragua respectively.

HIGHLY SUPERHEATED STEAM FOR LOCOMOTIVES.*

BY GILBERT E. RYDER.

From the results that have been obtained with superheaters in service, it is conservative to say that the saving which has been effected in the fuel consumption under average working conditions is 25 per cent. The saving is so large that we are liable to overlook the significance of the fact that this 25 per cent. saving in fuel really means an increased hauling capacity of 33 1-3 per cent. For instance, assume that we are burning 6,000 lbs. of coal per hour in a saturated steam locomotive, and are developing 1,500 h. p. hr. Suppose that we equip this same locomotive with a superheater, by the use of which we have been able to save 25 per cent. in fuel, that is, 4,500 lbs. of coal, are now developing 1,500 h. p. hr. Now, when 6,000 lbs. of coal are fired per hour the superheater locomotive will develop 2,000 h. p. hr., or an increase of 500 h. p. hr., which is an increase of 33⅓ per cent. in horse power hour.

Dry or moderately superheated steam has been frequently tried, but with little economy compared with a high degree of superheat. Many forms of superheaters designed to be located in the smoke box or in an intermediate combustion chamber have been tried but with unsatisfactory results. The smoke box type is open to serious objection on account of its low degree of superheat, and that it obstructs the front end and is expensive to maintain, due to the corrosion of the pipes and their deterioration occasioned by the abrasive effect of the cinders.

Prof. Benjamin and Prof. Endslay in a paper read at the Master Mechanics' Convention in 1910, gave the following data from tests: "The coal consumption per indicated h. p. hr. at 180 lbs. steam pressure for the locomotive using saturated steam was 3.50 lbs., and for 80 degs. of superheat was 3.40, a gain in efficiency of 2.8 per cent., while the consumption at 160 deg. superheat was 3.00 lbs., a gain of 14.8 per cent., which is five times the saving of the first 80 deg. Now, if points are plotted and a line indicating a steam pressure of 180 lbs. is carried as a smooth curve to 240 degs. superheat, it would indicate a coal consumption of 2.35 lbs., or a saving over the saturated engine of 32.8 per cent."

The fire tube superheater, which gives a superheat of from 200 to 250 degs., has been largely adopted by railways using superheated steam, because of the increased efficiency of the locomotive using such high degree of superheat. At present there are something over 12,000 locomotives in all countries equipped with fire tube superheaters furnishing highly superheated steam, and over 2,000 of this number are in service in the United States. The principal advantage secured through the use of highly superheated steam is due to the increased volume of steam delivered per lb. of water evaporated and the prevention of cylinder condensation. Tests show that, in Mallet compound engines without superheaters, the condensation in the receiver pipe runs up to over 20 per cent., while in simple saturated engines using a short cut-off, cylinder condensation runs up to over 35 per cent. of the weight of steam admitted to the cylinders; that is, for every 100 lbs. of steam delivered to the cylinder only 65 lbs. are available for doing work. This loss can be overcome by the use of highly superheated steam.

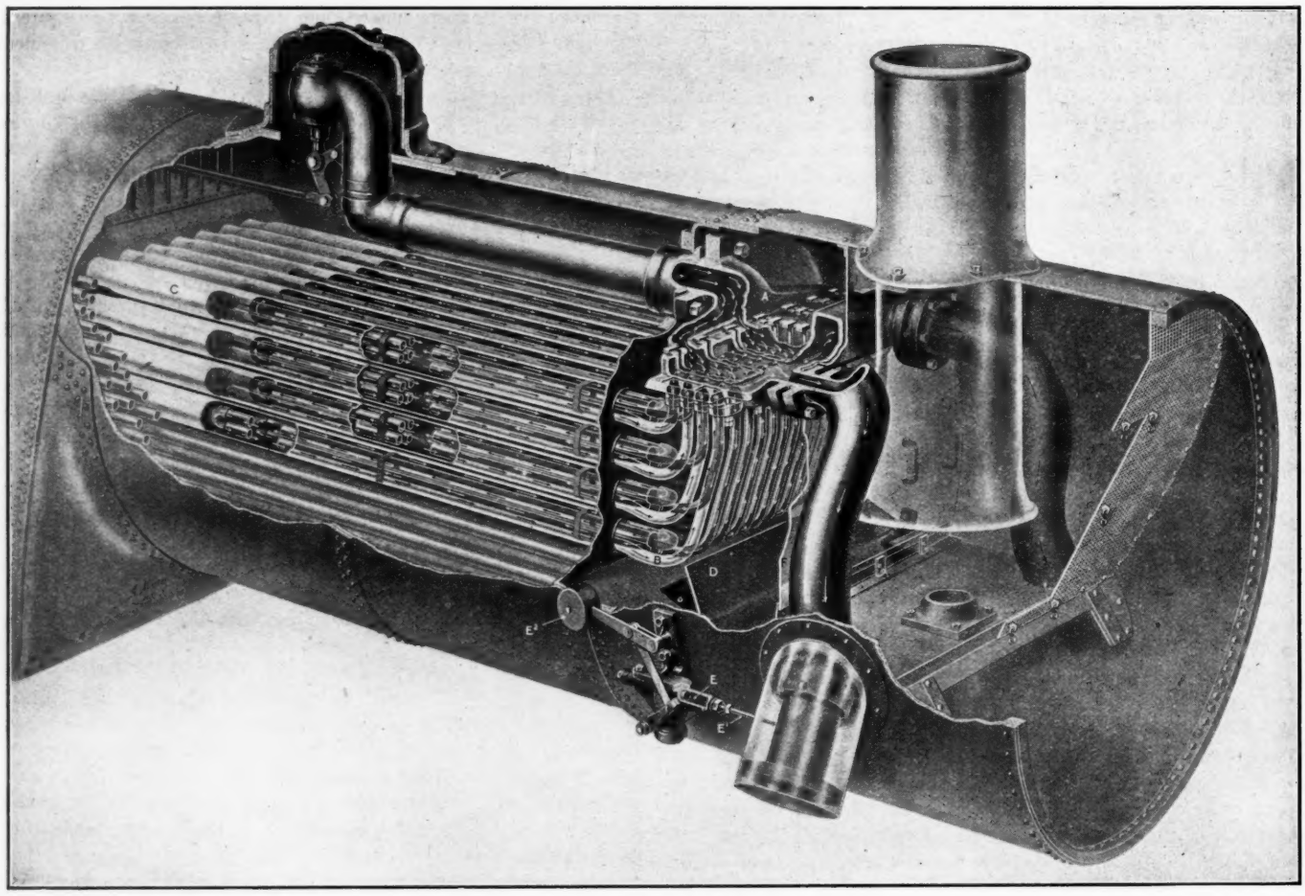


Fig. 1—Top Header Fire Tube Superheater.

Superheated steam partakes the nature of a perfect gas. It has a larger volume per unit of weight than saturated steam, and like a gas is a poor conductor of heat, giving up its heat to the cylinder walls and steam pipes less rapidly. Superheated steam at 170 lbs. pressure with 200 deg. F. superheat, has a volume of 3.27 cu. ft. per lb. against 2.47 cu. ft. per lb. for saturated steam. Of course, when superheated steam passes from the superheater

*Read before the Southern and Southwestern Railway Club, Atlanta, Ga., January 18, 1912.

to the comparatively cold cylinder walls some of its superheat is given up to these walls and the passages traversed in reaching the cylinders, but the condition differs from that of saturated steam in that it does not condense, until it has lost all of its superheat, and therefore, the superheater must be so designed that under all working conditions it furnishes more superheat than the steam can loose in the cylinders.

The effect of the superheater on the boiler is to increase the boiler capacity which would tend to decrease the demands that are made on it. It is therefore economical to force a superheater engine while it is not economical to force a saturated boiler in the same way. The fact has been proved that locomotives equipped with superheaters developing high degrees of superheat, have at least 25 per cent. greater boiler capacity than the same size of engine without a superheater.

In engines operating in poor water districts where foamy water and fluctuations in water level would tend to increase the amount of water carried over from the boiler, it can readily be seen that a device which reduces the demand on the boiler, and which still, in addition, prevents the water from reaching the steam chest and cylinders, will greatly lengthen the life of the valves and pistons, prevent breakage of cylinder heads from water pressure, and also lengthen the life of the boiler. Another feature which favors the boiler in the use of superheated steam is the comparatively low boiler pressure which may be carried, as the size of the cylinders is not limited, as in the saturated steam engines where the diameter of cylinder must be limited in order to reduce condensation. Standard recommendations for boiler pressure to be used in connection with superheaters are 180 lbs. for freight engines and 200 lbs. for passenger engines. In bad water districts even lower boiler pressures may be used with correspondingly enlarged cylinders.

The superheater shown in Fig. 1 consists of a header *A* supported on brackets in the smoke box and making a joint with the steam pipe in the same manner as the tee head. Attached to the header and in communication with it are the coils or units *B* made of cold drawn seamless steel tubing and screwed into return bends. Each unit is located inside a large flue *C*, and extends to within about 2 ft. of the back flue sheet. The larger boiler flues are set into the front and back flue sheets in very much the same manner as the ordinary small boiler tubes. The flow of gases through these tubes is controlled by a damper *D* which is operated by the damper cylinders *E* located at the outside of the smoke box. The normal position of the damper is open when the engine throttle is open, thus allowing the gases to pass through large tubes and come in contact with the superheater unit. It is operated by steam from the steam pipe, so that when steam is passing to the cylinders the damper will be open.

When the throttle valve is open saturated steam passes through the dry pipe and into a portion of the superheater header designed to receive the saturated steam. From this portion of the header which is in communication with one end of the superheater units the steam passes downward through one tube of the unit, backward toward the back flue sheet, forward and backward again, and then forward and upward to the other side of the header designed to receive the superheated steam. From the header it then passes into the steam pipes, then into the steam chest and into the cylinders. A detailed view of the header casting through several sections is shown in Fig. 2. Section through *AA* shows a section of the steam pipe connection of the header and the passageway and also the back and front end passage for the saturated and superheated steam. The passage way marked *S* represents the superheated and that designed *W*, the saturated steam passageway, which are in communication with the respective chambers marked *S* and *W*, in the section to *CC*. The units, which are shown in Fig. 3, are held in place by a bolt which extends through slots in the header casting between the superheated steam and saturated steam chambers, and are prevented from turning by bosses or lugs located at the top facing of the header. The section through *BB* shows a section of one of the top steam pipe connections, and is similar in other respects to section *AA*. In the plan view of the lower side of the casting

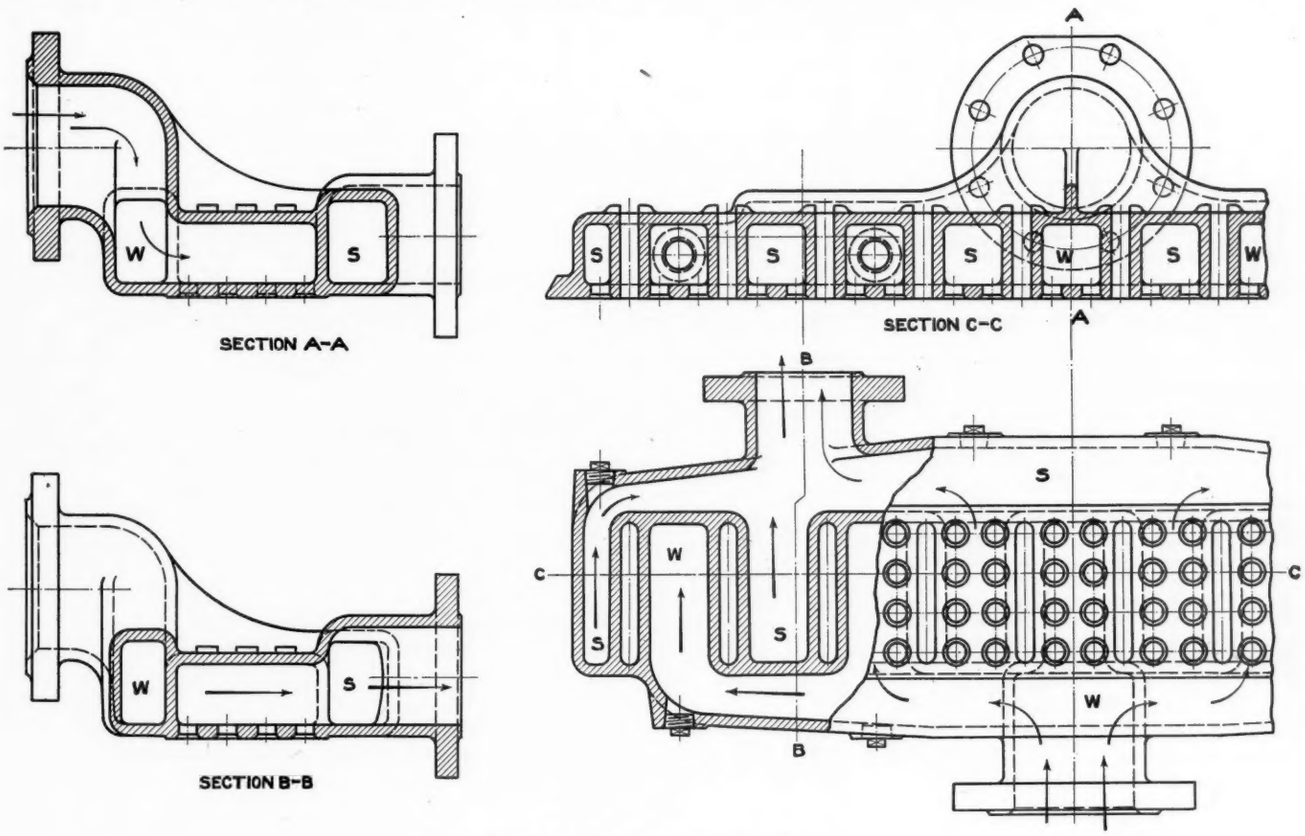


Fig. 2—Sections Through Superheater Header.

is also shown a part cut away to indicate the arrangement of the saturated and superheated steam chambers and the direction of the flow of the steam through their passages. The ball connections of the tube units, shown in Fig. 3, are each ground to fit the seats in the header casting and are clamped to the header. This clamp is supplemented by a ball ring fitting under the ball of the

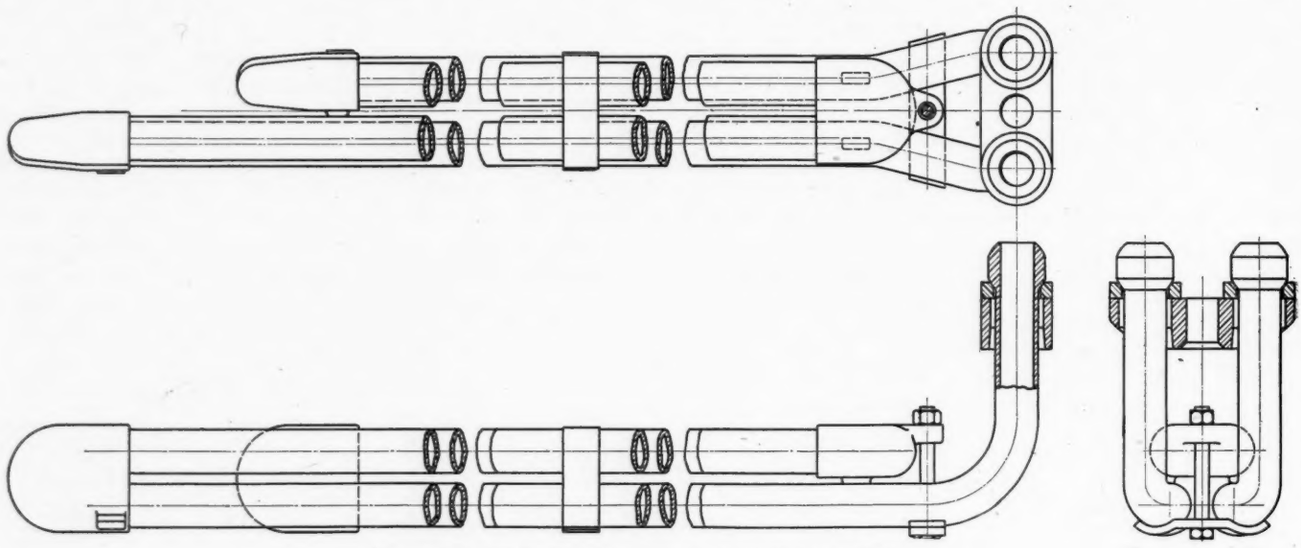


Fig. 3—Small Tubes Composing Superheater Unit.

tube in a manner that will provide for any irregularity that may occur in the ball heads or in the depth of the seat in the header. The return bends are of cast steel and are provided with lugs which rest against the inside of the large flues and keep the superheater units in the upper part of each flue.

The superheater tubes may be easily removed and replaced and in doing this it is not necessary to take down the steam pipes. It is also possible to thoroughly inspect the front end, and do all necessary work on the boiler flues, boiler tubes and the front tube sheet seam, without the necessity of taking down the superheater header or the steam pipes. A hand hole opening is usually provided on the smoke box sides through which inspection may be made of the entire front end of the superheater by the aid of a light, without taking down the front end netting or even opening the smoke box door.

The joint rings between the steam pipes and header, and the steam pipes and cylinder should be made of cast iron, as a brass ring would not stand the high temperature. Piston valve rings, piston rings and bushings should be made of close grained cast iron. The ordinary designs of piston rod packing rings should have a higher melting point than usual in saturated engines. An alloy of 80 per cent. lead and 20 per cent. antimony has given satisfaction. A very essential requirement in connection with the superheater locomotive is the use of good oil and continuous lubrication. The system found to be best adaptable for a simple two-cylinder engine is a five-feed lubricator, the leads being placed in the steam pipes or in the center of the steam chests and into the center of the cylinder. The fifth feed is for the air pump steam pipe, as is usual. The feeds to the steam chest should enter the center of the steam chest and should not be branched off. The steam chest should get three or four drops of oil for each drop fed to the cylinder. Vacuum valves of ample size on each steam chest are more essential in a superheater engine than in ordinary engines on account of the higher temperature of the steam chest walls. While the engine is working steam, the oil is sufficiently protected by the steam against carbonizing. While drifting, however, the oil has no such protection, and on account of the high temperature of the steam chest walls would have a tendency to carbonize, which can be overcome by a vacuum valve letting cold air in. For similar reasons we recom-

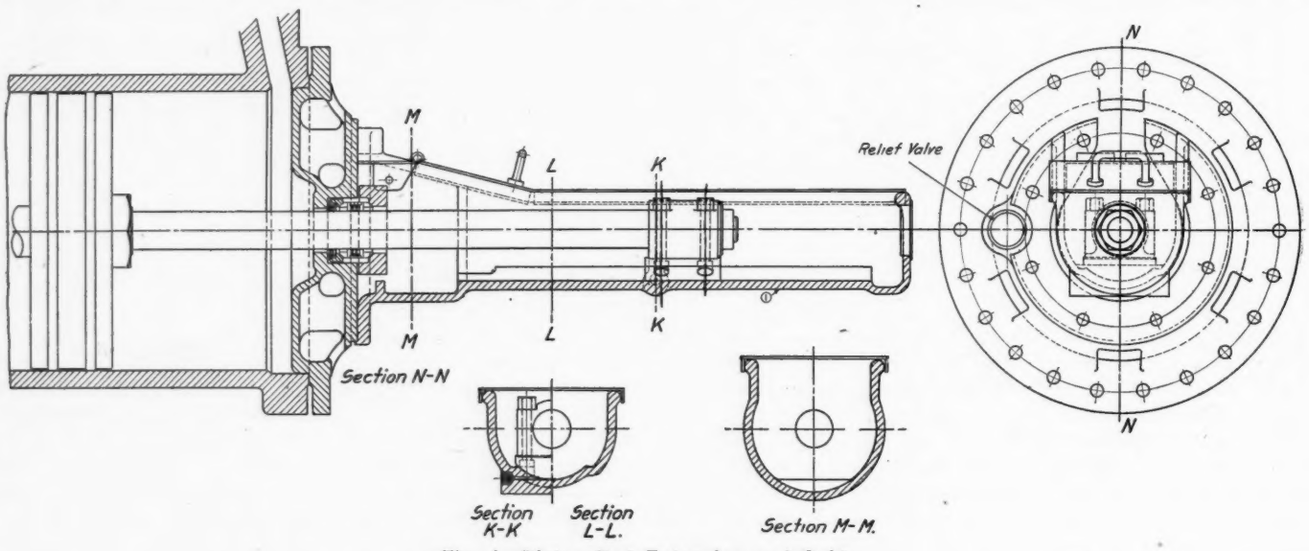


Fig. 4—Piston Rod Extension and Guide.

mended the use of drifting valves or at least to crack the throttle at the beginning of a long stretch of drifting.

The piston rod extension has also been found to be of considerable value in reducing the wear of cylinder bushings and cylinder packing rings. The extended rod riding on guides relieves the cylinder bushings and rings from the weight of the piston, and thereby reduces the friction and the wear upon them. The design of the extended piston rod which is illustrated in Fig. 4 has been applied to a large number of superheater engines during the last twelve months with satisfactory results. This design was developed by F. J. Cole, chief consulting engineer of the American Locomotive Company. The history of the extended piston rods is marked by a number of designs which have not been successful. A piston rod extension to be satisfactory must be of simple yet rigid construction; easy to lubricate and easily removed without interfering with other parts of the locomotive, and above all, it must have an ample bearing surface, a feature which was lacking in all of the earlier designs of piston rod extensions.

As will be seen from the illustration, the principle of the present style of extended rod guide is that of a miniature crosshead at the front end of the extended rod, and this slides on a cylindrical surface, which is rigidly supported and easily located on the cylinder head. The design permits of maintenance being easily and quickly made by lining up between the small crosshead shoe and its body. The packing on the extended rod is easy to access and may be attended to without difficulty.

The guide for this small crosshead is self-centered on the circular flange of the cylinder head and thereby requires no adjustment in service, as it cannot get out of position. A feature of this design of extended piston rod is that the guide is made with an open top so that when it is necessary to remove it, it can be dropped from the rod and does not require a large amount of space ahead of the cylinder.

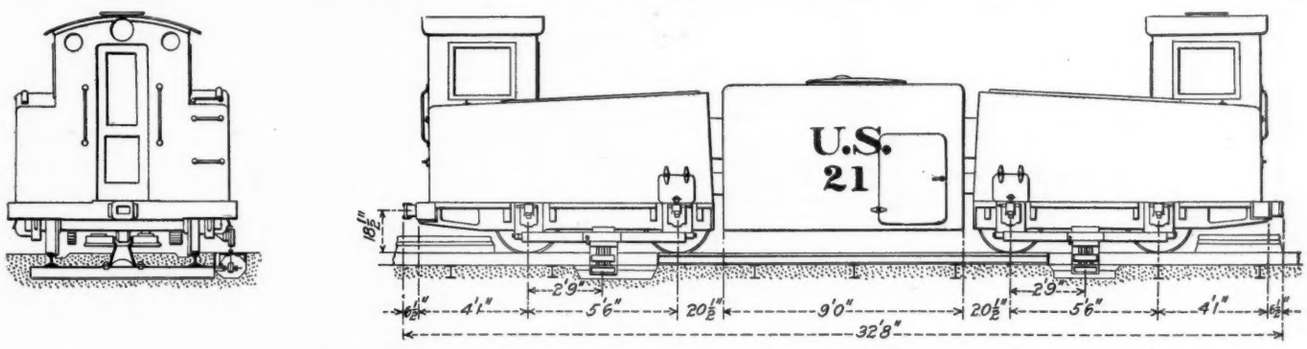
The superheater can be successfully applied to any of the existing types of locomotives provided these locomotives are equipped with piston valves, and with it the locomotive will be able to haul correspondingly heavier trains on the same schedule, on the same trains on a proportionally faster schedule. It has been found in many cases that trains double headed with saturated engines could be handled with one superheater engine. The boiler maintenance is also reduced in that it is possible to use a lower boiler pressure if the construction of the cylinders is such that their diameter may be increased. By increasing the size of the cylinders without decreasing the boiler pressure the engine is given a greater starting power and the increased boiler capacity will more than take care of the demands of the larger cylinders for steam.

The railway connecting two navigable stretches of the upper Congo, in the very heart of Africa, has recently been completed, and on October 11 last a steamer was launched to ply on the upper stream. The new railway is 221 miles long, and runs past rapids in the river. The boats above it penetrate the copper mine district called Katanga.

ELECTRIC TOWING LOCOMOTIVE FOR THE PANAMA CANAL LOCKS.

The contract for building an electric locomotive to be tried out in canal service at the Isthmus has been awarded to the General Electric Company, Schenectady, N. Y. If this locomotive, after sufficient tests, proves to be adequate for service 39 more will be ordered from the same company. This is in accordance with the plans of the commission. The system of towing outlined has been patented by Edward Schildhauer, and the commission has the right to use the machines covered by this patent without making any compensation therefor. Under this system four locomotives are required to tow a vessel of moderate size through the locks. Two are to be used ahead, one on either wall, for towing; and two behind, trailing. The latter are for the purpose of keeping the vessel in the middle of the lock and to bring it to a stop when entirely within the lock chamber.

The speed of the ship through the locks will be at the rate of 2 m. p. h., and the vessel will be held steady between four lines of taut cables. The ship will come to a full stop in the fore bay of the lock, where the cables will be attached to it, two forward on either side and two aft. The other ends of the cables will be attached to the windlasses on the four towing locomotives operating on the lock walls. When towing or taking the inclines between locks the locomotive will operate on a rack rail.



General Design of Electric Locomotive for Canal Towing Service.

In returning, except on the inclines between lock levels, the locomotive will travel under friction tractive effort at 5 m. p. h. This change of speed is made through jaw clutches operated by solenoids which connect the wheel trucks with the traction motors.

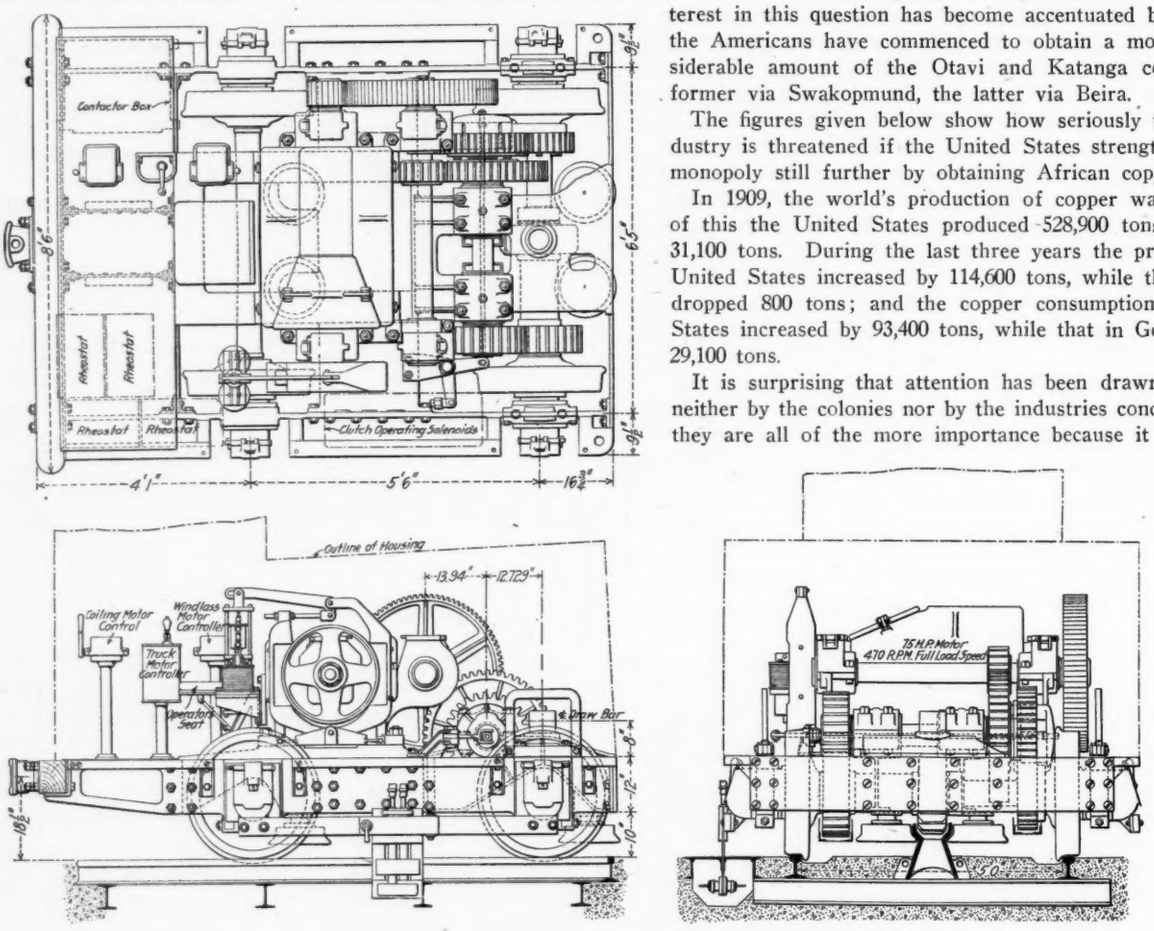
The track gage is 5 ft. and the short inclines between lock levels have a rise of 1 ft. in 2 ft., with vertical curves of 100 ft. radius and horizontal curves of 200 ft. radius. The maximum load that will be thrown on the traction motors, gearing and rack occurs when the locomotive, without load, ascends the inclines between lock levels. As little weight is required for adhesion when driving the locomotive empty, care is taken to avoid surplus weight, and the whole locomotive will be made as light as is consistent with its strength and durability.

The illustrations show the general plan of the central portion of the locomotive, as planned by the commission, which is called the body. It will contain the motor-driven windlass for hauling in or paying out the towing line; also a high-speed motor driven attachment for coiling the towing line when it is out of service. The windlass drum is to be fitted with a friction device so that the load on the tow line can never exceed 25,000 lbs. By means of semi-flexible connections this central body is supported at either end by the trucks. The two trucks are identical in every way, and they contain the traction motors and the control apparatus. The truck has a plate frame with pedestals for the journal boxes something like that of a locomotive, but these boxes are fixed and there are no springs above them. The frame supports the motor, base plate and counter shaft bearing.

No special electric motors are specified, but it is required that they shall be such as have been developed and successfully used in railway work or in the operation of steel rolling mills for a period of one year, that service being comparable to the service

proposed. Experience has shown that the climatic conditions on the Isthmus have a very deleterious effect on all ordinary insulation and a marked effect in accelerating corrosion of metal parts. Special attention must, therefore, be given in the construction of motors to secure materials and construction which will avoid as far as possible these results.

The motors will be 3-phase, 25-cycle, 220-volt, totally enclosed, moisture proof, high torque, railway or mill type. Those for traction purposes must have a full speed torque of 840 lbs. at 1 ft. radius, a full load speed of not less than 470 r. p. m., and be capable of developing not less than 75 per cent. greater torque for a period of one minute. The motor for the windlass must have a full speed torque of 120 lbs. at 1 ft. radius, and be capable of exerting 50 per cent. greater torque for one minute and have a full load speed of 660 r. p. m. The motor for coiling the cable is to have 30 lbs. torque at 1 ft. radius, with 50 per cent. overload for one minute, and a full load speed of not less than 630 r. p. m.



Details of Truck for Electric Towing Locomotive.

The tow line will be 1 in. in diameter, made of plow-steel wire rope composed of six strands of 37 wires each, with a hemp center, these wires to have a tensile strength of not less than 22,500 lbs. per sq. in. The ultimate breaking strength of the rope must be not less than 70,000 lbs. The length of the line to the center of the loop is to be 225 ft., and no splicing will be allowed except at the loop.

The 3-phase current will be collected for the locomotive by means of plows in an open conduit, each plow carrying two contact shoes insulated from each other and bearing on the two conductor rails, respectively, one for each of the two phases, while the third phase will be carried by both track rails. The specifications for these locomotives are very elaborate, and include many of the standard specifications adopted by the canal commission for various materials, and also cover inspection and tests required by the government for acceptance.

THE TRANS-AFRICAN RAILWAYS.*

In Africa, owing to the export of ore from the Katanga district, the following railways have come to the fore: the Cape to Cairo railway, initiated by Cecil Rhodes, which after some delay has now in its southern section already crossed the southern frontier of the Congo Free State, 2,145 miles from Cape Town, and is operated up to Elizabethville 2,323 miles; and the lines proposed by the author [State Councillor Schwabe], namely Daressalam-Bismarckburg-Katanga Lobito (Indian to Atlantic ocean) and Swakopmund-Victoria Falls-Beira (Atlantic to Indian ocean).

The chief object of these three lines is the transport of ore, especially copper ore from the Katanga district of the Belgian Congo to the Indian ocean ports, Beira and Daressalam, and to the Atlantic ocean ports, Swakopmund and Lobito. The interest in this question has become accentuated by the fact that the Americans have commenced to obtain a more or less considerable amount of the Otavi and Katanga copper ores, the former via Swakopmund, the latter via Beira.

The figures given below show how seriously the German industry is threatened if the United States strengthens its copper monopoly still further by obtaining African copper ore:

In 1909, the world's production of copper was 844,100 tons; of this the United States produced 528,900 tons and Germany 31,100 tons. During the last three years the production in the United States increased by 114,600 tons, while that in Germany dropped 800 tons; and the copper consumption in the United States increased by 93,400 tons, while that in Germany dropped 29,100 tons.

It is surprising that attention has been drawn to these facts neither by the colonies nor by the industries concerned, although they are all of the more importance because it is necessary to carry out important undertakings, during a number of years, in order to prevent the permanent injury of German interests by the Americans.

The state of affairs is at present as follows: as yet no coal has been found in the Congo Free State. The nearest coal is in the Wankie pits on the Cape to Cairo line, at a point 72 miles south of the Victoria falls; this is said stated to cost $25 per ton in the Katanga district. This enormous price makes it impossible to smelt the ore, so it is concentrated and taken to Beira, on the Indian ocean, and there shipped in more or less large quantities to America. Now the distance by rail from Elizabethville to Beira, 1,625 miles, is shorter by 649 miles than the way via the Congo, but is still 414 miles longer than the proposed railway line Elizabethville-Moliro-Bismarckburg-Kilossa, to connect with the Daressalam-Kilossa line which is already in operation.

This makes it all the more probable that this great reduction

*From the *Zeitung des Vereins Deutscher Eisenbahnverwaltungen.*

of distance will make it possible to divert at least part of the traffic to and from Beira through German East Africa to Daressalam, all the more so as this way makes it possible to smelt the copper at works to be erected at the junction with the Kivira branch, where cheap Kivira coal is available, and then export the copper in the metallic state. Apart from this traffic, the Kivira coal is also of no less importance for the Katanga district as well as for the steamers on both lakes, for firing on the railway and for supplying ocean steamers putting in at Daressalam; then also the cotton wool exported from Rikwasenke comes into consideration. This state of affairs will be but little affected by the subsequent opening of the Benguela line, Lobito-Katanga, as Angola also has no coal and consequently, as the railway routes to Daressalam will be of approximately equal length, the existence of Kivira coal will continue to be a distinct advantage.

In addition to the Daressalam-Kilossa-Bismarckburg line just mentioned, we also have to take into consideration the central railway, which is already being built beyond Kilossa; at the end of March the rails were already laid to a point 260 miles beyond Morogoro. When this railway has reached Tabora it will probably, owing to economical and military reasons, be continued without break to Ujiji, on Lake Tanganyika. This is very probable, as the Belgian colonial minister has submitted to the Chamber a report in which five different railway lines are described as necessary:

1. The Katanga line from Elizabethville to Bukama, the point up to which the Lualaba is navigable.
2. A line from Katanga to the lower Congo, from Bukama to Lusambo (later on perhaps to Leopoldville).
3. The Tanganyika line from Kabalo to the Tanganyika in the Lukuga valley (at present under construction).
4. A junction line connecting a point on the Katanga line (Ruve) to the Angola frontier, to join the Lobito line.
5. The Urua line from Pueto to Kiambi and Ankoro.

It is worth noting that the Belgian colonial minister, in spite of the competition with the Congo road, intends to build not only line No. 4, in order to connect with the Lobito line, coming from the Atlantic ocean, which is being built by an English company, but he also wishes to build line No. 2 to Lusambo and perhaps later on to Leopoldville, the terminus of the old Congo line Matadi-Leopoldville in order to cut off the curve, larger than a semicircle, of the Congo with the two lines Stanleyville-Ponthierville and Kindu-Kongulu, which cut off the cataracts. Seeing the great cost, it may be doubled whether the whole length of this line will be built. It is remarkable that in these plans so little attention is paid to the German East African railway plans. Line No. 3 is, it is true, to reach Lake Tanganyika, but by the Lukuga valley, about 93 miles south of Ujiji, hitherto taken as terminus for the central line. Hence Germany and Belgium must come to an agreement that the railways ending on the two sides of the lake should come opposite to each other, so as to make it possible to have a steam ferry for taking the train across, to avoid the necessity for any transshipment.

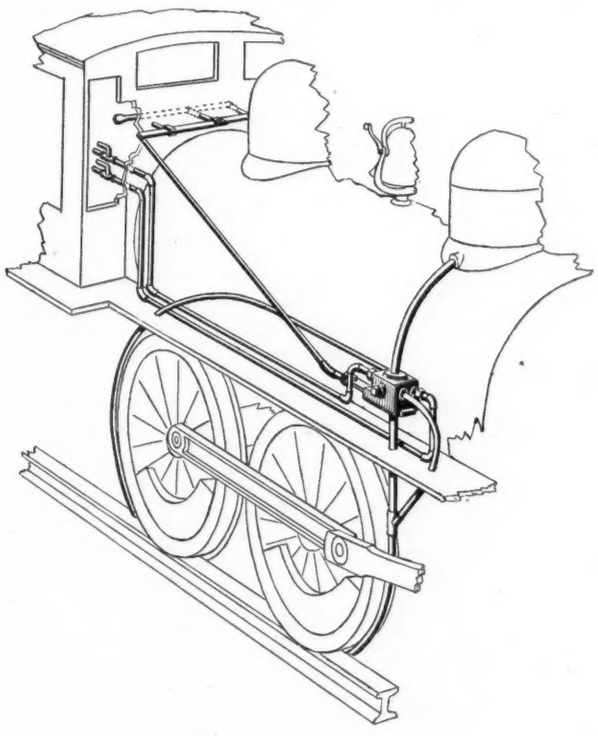
It might seem even more remarkable, that instead of line No. 5 it has not been proposed to build a line from Pueto to Lake Tanganyika in the Bismarckburg direction, and to the west to join line No. 4 to Lobito bay, so as to import the cheap Kivira coal with the help of a steam ferry across the lake, and to carry the ore from the Katanga district by the shortest route to the Indian ocean, and so make a connection between the Indian and the Atlantic ocean.

As regards the conditions on the second Trans-Continental line, Swakopmunde-Victoria Falls, of which the section, about 540 miles long, from the terminus of the Otavi line through the Caprivi district to its connection with the Livingstone Victoria Falls station on the Cape to Cairo line still has to be built, it is true that, according to the statements of Captain Streitwolf in his recently published book Der Caprivizipfel, conditions are on the whole less favorable than was hitherto thought. It has been found that in this district the land near the river is extensively flooded every year, as in the case of the Nile, but that the mud deposited by the water is not rich, as in the case of the Nile, but is sandy. Nevertheless, there are large areas of good and of very good land which only awaits the plough. In the country flooded by the Okavango, in particular, we find fertile ground, green fields and splendid woods. Moreover, it has been found that the Zambesi, which forms the boundary of the Caprivi district for a length of about 68 miles is, it is true, navigable, but can hardly be used, on account of the many rapids, for the carriage of goods, even if small motor boats are used. Finally, it was found that the Katimo-Molina falls only form the biggest of the existing rapids, and it is, consequently doubtful whether there is sufficient fall to make it possible to put up a larger power station. Nevertheless, the Caprivi district is valuable not only on account of its richness in timber, but also because there are extensive stretches of land suitable for growing cotton.

As regards the question of building a railway through the Caprivi district, one has in the first place to consider the great importance to German industries of having a road from the Atlantic ocean through southwest Africa to northern Rhodesia and to the Katanga district of the Congo Free State; another important consideration is whether it will be possible to divert part of the northern Rhodesia and Katanga ores, which now go via Livingstone to Beira and then are sent a long way round the Cape to the United States, to Swakopmund, as the distance Livingstone-Bulawayo-Salisbury-Beira is about 955 miles, while the distance Livingstone-Grootfontein-Swakopmund is only about 905 miles; thus, quite apart for the shorter sea journey, the railway journey is still 50 miles shorter.

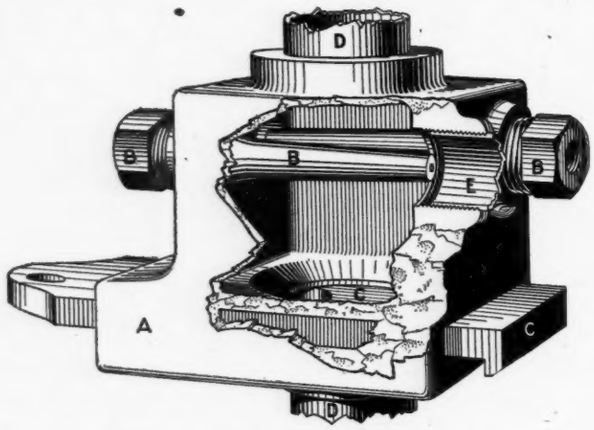
STICKLEY TRACK SANDER.

The Stickley sander, which has been successfully used for more than 3 years on one of the large railway systems is shown in the accompanying illustrations. The general arrangement shows it located just above the running board with a pipe leading from the sand box, and delivery pipes to either the front or back drivers. The cross section shows the slide *C*, which is operated by hand from a lever in the cab. This slide insures the



Stickley Track Sander.

removal of any obstruction, and when it is open offers a free passage equal to the area of a 1¼ in. pipe from the sand box to the rail. This is intended as a safety feature to obviate any chance of the sander becoming clogged and inoperative by air. The box, *A*, containing this valve is made of malleable iron and is 4 in. square. In it are two air nozzles, *B*, one for the rear driver and one for the front, and these are operated by separate handles in the cab. When the air is first turned on it blows



Discharge Box of Stickley Sander.

out what little sand is in the front of the nozzle, and this creates a vacuum immediately behind the end of the nozzle or outlet *E*, and the pressure at *E* carries the sand through the pipes to the rail. The back-up sanding feature is as efficient as the go-ahead, and this is particularly advantageous on switch or freight engines. The sander is simple and durable, as there are few parts to wear. Those in use three years have caused no expense for repairs. This sander is sold by the Jerome Metallic Packing Company, Chicago.

MISSOURI PACIFIC SIGNAL LAMP WITH FRESNEL LENS.

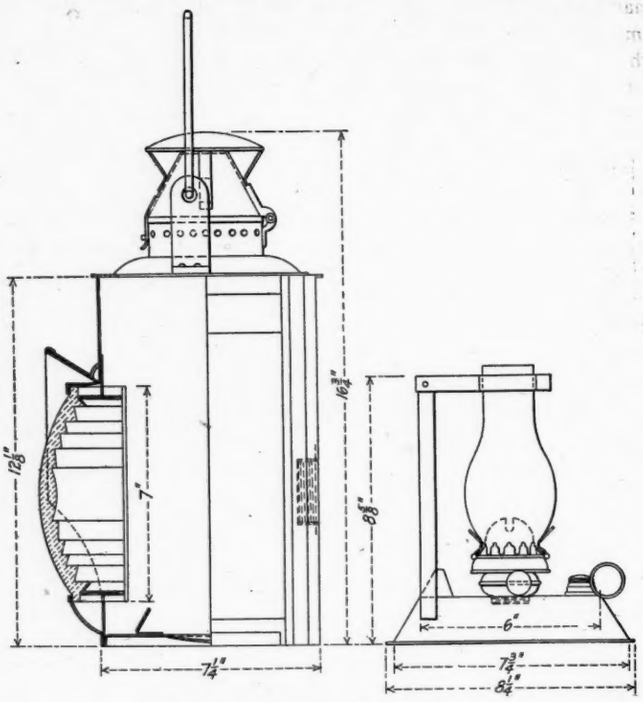
The drawing shown herewith, for which we are indebted to B. H. Mann, signal engineer of the Missouri Pacific, shows the construction of the tail lamp for passenger trains recently introduced on that road and which was noticed in the *Railway Age Gazette* a few weeks ago. This lamp is carried on the platform of the car, the regular markers at the sides of the car, near the roof, being of the usual style with bull's eye glasses. The general appearance of the new lamp is shown in the photograph.

The lens is 7 in. in height and the same in width. The size of the lantern at the bottom is 7¼ in. x 8⅞ in., and the extreme depth from front to back, including the hood at the sides, is 10½ in. The door at the side has an opening of 5½ in. The lamp has a ⅞-in. burner and a chimney 6 in. high. Having so large a lamp it was necessary to provide liberal space for ventilation, and auxiliary air inlets are provided, one on either side. Through these the air from the atmosphere enters at the top and passes into the lamp at the bottom. The openings for the admission of air are covered by hoods, one of which is seen at the right, near the top, in the photograph.

With a Fresnel lens the rays of light are spread through a field of 90 deg., or (on a straight road) 45 deg. to either side of the roadway, thus insuring a better view of the lamp from a following train when on a slight curve; and even on a considerable curve, if there be no buildings or other obstructions to the view on the inner side of the curve.

Mr. Mann informs us that this light compares favorably as to distinctness with the standard bull's eye tail lamps of the road, which have red lenses 6⅜ in. in diameter and ordinary ⅝ in. signal burners without chimneys.

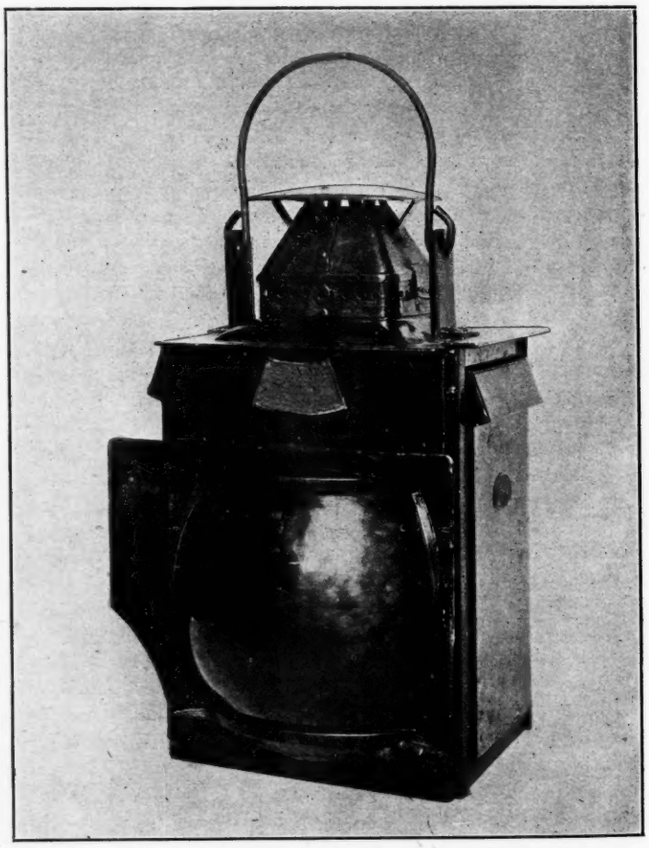
A lamp with Fresnel lenses has been adopted also for the cupola of freight cabooses. In this the lenses are white instead of red, because it is necessary frequently to change the color



Missouri Pacific Tail Lamp.

from red to green. This is accomplished by 5-in. colored roundels fixed in a revolving case inside of the lamp. This cupola lamp shows both to the front and the rear.

The passenger lamp costs about $10 and the caboose lamp $14.



Tail Lamp with Fresnel Lens

General News Section.

The government has brought 16 suits against the Erie in the federal court at Pittsburgh, Pa., for violation of the hours-of-service law.

The Texas & Pacific has announced its intention to run motor cars regularly between Dallas, Fort Worth and Mineral Wells, Tex. There will be three cars in service.

Pacific time is now the standard throughout the Western Pacific from Oakland to Salt Lake City. Heretofore Mountain time has been the standard east of Gerlach, Nev.

The Illinois Central has issued an order allowing the wood from 40 worn-out freight cars being dismantled at the Burnside shops to be given away to the poor for fuel, on application.

The Interstate Commerce Commission is gathering together data on the cost to the roads of underwriting recent issues of securities, and it is understood that the commission has a history of the financing of 20 railways.

The Western district of the Southern Railway, made up of the Atlanta, Birmingham, Columbus and Mobile divisions, will, after February 1, be known as the Southern district; and the St. Louis and Louisville divisions will be known as the Western district.

The assistant attorney-general of New Jersey, in an opinion issued last week, holds that a railway company, in issuing a pass to an officer of the state, where the furnishing of the pass is required by law, cannot require the officer to enter into an agreement exempting the carrier from liability for damages.

The Missouri State Board of Health has issued an order prohibiting the use of the common drinking cup, roller towel and comb on railway passenger trains in the state after March 1. The railways have advised the board that individual cups and towels will be supplied on the trains, but passengers will hereafter be expected to furnish their own combs.

Mr. Parker, of Salem, has introduced in the New York legislature a bill to amend the public service law so as to provide that reorganizations of railway and other public service corporations shall be subject to the control of the public service commission. The Court of Appeals recently decided that the Third Avenue (surface street) Railroad, New York City, could be reorganized under the old law without going to the commission.

The semi-annual meeting of the National Association of Scale Experts was held at St. Paul, Minn., on January 14. Twenty-nine members were present, including representatives of ten railways. Papers were read as follows: "Railroad Track Scale Foundation," by F. L. Berry, Fairbanks, Morse & Company; "Relation of Care in Weighing to the Scale as a Means of Weighing," by D. G. McGrath, scale expert Minnesota Railroad & Warehouse Commission; "Wagon Scale Construction," by Frank Wondra, Fairbanks, Morse & Company. The next meeting will be held in St. Paul, July 14, 1912.

A bill providing for publicity of the security issues of corporations engaged in interstate commerce has been introduced in Congress by Representative Harrison of New York. The bill embodies recommendations which were presented in the report of the Railroad Securities Commission recently sent to Congress by President Taft. The bill provides that interstate corporations issuing stocks or bonds shall, under regulations to be prescribed by the Interstate Commerce Commission, make public the total amount to be issued; the amount to be retained in the treasury; the dates of maturity and rates of interest of any such bonds, notes or other evidences of indebtedness and all other information relating to security issues of concern to prospective investors.

The Public Utilities Commission of New Jersey, holding less positive views than the governor of the state, reports to the legislature that the passage of a full crew law at the present time is not advisable. The bill on this subject, which was presented in the last legislature, is declared to be too drastic and not fitted to cure the evil which it seeks to correct. The commission takes the view that it possesses the power already, under the law, to order an increase in the size of a train crew, where such increase may be necessary to furnish safe, proper and adequate service. Still, as the railways always carry everything to the courts, thus resisting the action of the commission so far as possible, it may be necessary to deal with the full crew question by statute.

The Pennsylvania announces that its offer to pay its men for valuable ideas has already produced good results. For some reason not disclosed the offer was promulgated only on the Buffalo & Allegheny Valley division, which has only one-fifth of the road's mileage. Suggestions at once came in from all quarters. A roundhouse clerk won a premium by submitting a plan for increasing economy by the further use of carbon sheets which remain in repair card books, after the cards have been filled up and removed. He devised a way of using this carbon paper in connection with a form for ordering material from the store houses. A tinsmith discovered an improved method for fastening in engine cabs the boxes which contain flags, torpedoes and medical case. By standardizing the heights of coal gates on tenders, a fireman saw a way to minimize the loss of coal through vibration. He was paid for the idea. At one of the terminals, an appliance for cleaning and sterilizing drinking cups used in coaches was perfected by a car inspector, and he received payment for it. Many worthless suggestions came in, but the officers say that the saving effected by those which are adopted makes it very much worth while to investigate them all. And there is the indirect gain in the added interest that the employees take in their work, and in the watchfulness and originality which is developed.

A Correction.

In an article on "The Mimeograph for Railway Printing," published in the *Railway Age Gazette* of January 19, page 94, it was stated that the cost of printing tariffs by mimeograph had been found to be approximately 20 per cent. less than the cost of obtaining excellent work by the printing press. The statement should have read that excellent work could be obtained by the mimeograph at 20 per cent. of the cost by the printing press.

Opening of the Florida East Coast to Key West.

The Florida East Coast Railway was opened for traffic through to Key West, Fla., on Monday last, according to the announcement, with an elaborate celebration lasting three days. Mr. Flagler, the builder of the road and chairman of its board of directors, who is now 82 years old, was one of the principal figures in the public exercises. Warships were present in the harbor from a number of foreign nations, together with vessels of the fifth division of the American Atlantic fleet. The President of the United States was represented by R. S. Oliver, Assistant Secretary of War, and there was a large representation of Congressmen who, after the celebration, made a trip to Havana on the cruiser *Washington*.

The construction of this remarkable railway, which for a distance of over 70 miles is over water and so far from the main coast that the passengers in the cars are at times unable to see land, was described and illustrated in the *Railroad Gazette*, February 7, 1908. The following statistical data we take from the *Wall Street Journal*, while the tribute to Mr. Flagler, contained in our last two paragraphs, is from the *New York Sun:*

Construction of the Key West extension was probably as difficult a piece of railway building as has ever been attempted. It is a unique and expensive structure, in some places costing as much as $900,000 a mile. It includes six miles of solid concrete viaduct, 81 miles of embankment 30 ft. above low water level, and eight fixed and two draw bridges. The longest viaduct is a solid concrete structure of 180 arches and nearly two miles long. Protection from the action of the ocean is furnished by a series of interposing keys, the construction of which called for a heavy additional outlay of time and money. The entire length of the road from Jacksonville to Key West is 522 miles and there are 95 miles of branch lines. The cost of the entire road was approximately $37,000,000, all of which was carried by Henry M. Flagler personally until 1909, when $10,000,000 first mortgage

bonds were sold, reducing his investment to about $27,000,000. The road was completed from Jacksonville to Miami in 1895 and from Miami to Knight's Key in 1908. Construction of the last 45 miles to Key West has taken over three years. Capitalization of the road is $3,000,000 stock outstanding, with $2,000,000 authorized for sale at par to cover cost of the present extension and the purchase of car ferries and other equipment, $10,000,000 first mortgage bonds and $20,000,000 general mortgage income bonds. Cost of the entire road was approximately $60,000 a mile, stock outstanding $5,000 and bonds $50,000 a mile. Gross earnings for the year ended June 30, 1911, of the 476 miles of road to Knight's Key were $4,181,278, or $8,784 a mile. Net was $1,566,517, or $3,291 a mile. Surplus after all charges, including 4 per cent. on the income bonds, was $67,130.

Mr. Henry M. Flagler's imagination was as potent as his money in the daring enterprise of extending the Florida East Coast Railway to Key West. It is a grand thing to possess the means to build an ocean railway to the isolated city of winds and waters from which Havana can almost be seen across the strait. But the dollars without the imagination would never have built this prodigy.

Perhaps within the shelter of this unique railway the indefatigable coral makers will find such congenial surroundings that in the future the keys and bridges on which the rails rest will become one structure, solid and beautiful. But should nature be content to leave Mr. Flagler's creation in the present condition, it will stand as a sufficient monument to the courage and previson of a man who, not satisfied with redeeming a state, has had the audacity to run a railway where nobody else ever thought such a thing possible. If Mr. Flagler had not done it what other man in the United States in our time would have thought of doing it? A man approaching 80 who could plan such an enterprise and resolutely push it to completion in the face of obstacles that often seemed insurmountable, is a man of heroic mould. New York has been brought within fifty hours of Havana, and the sea part of the journey has been reduced to six hours. Key West is now really in the United States and can get its supplies by rail. Its importance as a naval base has been vastly increased. The most southerly county seat in the United States, with its feet in the waters of the Gulf and its eyes for nearly a hundred years straining enviously in the direction of the continental United States, it now promises to become a great seaport. This was a great day for Florida, for Key West, and for Henry M. Flagler. What man of 82 ever before enjoyed such a triumph?

Mr. Hill's Business Creed.

The fundamental economic factors underlying the present position of the United States and governing its immediate future are few and simple. Only a multitude of counselors and words have made them appear complicated or difficult to deal with. A firm, dispassionate enforcement of the law, a rearrangement of tariffs and other industrial conditions such as to enable us to compete in foreign markets, encouragement for the farmer and improvement in agriculture that will double our farm products, the discontinuance of attacks on business as business and capital as capital, with assurance of protection and undisputed possession of reasonable profits for every industry conducted within the law, the social ostracism and political retirement of the demagogue, who sows evil a thousand times more deadly than he professes to cure, the establishment of strict economy and expenditure both in public and private life, cessation for the time being of legislative activity, not directed toward curative or tonic end, these are the fundamental economic factors underlying present day conditions in the United States. By so simple a program may the country not only enjoy a new and prolonged prosperity but achieve a distinction, both industrial and civic, such as it never knew before.—J. J. Hill, in New York *Times*.

Rebuking the Station Agent.

Back in the 70's there were two railways entering Fulton, Ky. On a certain day there was in the waiting room awaiting a Mayfield train, a very distinguished, revered and beloved citizen. He was an unpretentious, ordinary looking man, but was very intelligent and possessed of a big and sympathetic heart and loved his country and its people. He was upon this occasion pacing the floor, apparently in deep thought, when a man in the humbler walks of life entered and called for a ticket to Martin Station, which was located on the other line. The ticket agent informed him in a very abrupt and sarcastic manner that he was not selling tickets to points on that road.

The inquirer, much embarrassed, withdrew, when the distinguished citizen advanced to the window and calling the ticket agent by given name said: "I have been over a great deal of this country; I have occupied a seat in the Congress of the United States; I have been to Europe and have met and conversed with many of the great men of the land, including the president of the United States, as well as foreign representatives, and have been in the presence of Her Majesty, the Queen. But let me say to you upon the honor of a man, I have never felt my insignificance half so much as when in the august presence of a dirty, stinking little railway ticket agent." And he quietly resumed the walking of the floor.—A. P. Dulin in *Illinois Central Employees' Magazine.*

Economy Campaign on the Chicago Great Western.

Hiram J. Slifer, general manager of the Chicago Great Western, has had posted at shops, stations and other points, a large poster calling attention to various methods of saving money. The circular is printed in large type emphasized by several words in red ink and is headed "Stop! Look! Listen! Small Leaks Mean Great Waste." The body of the poster reads in part as follows:

"If you are in the station, train or yard service you can assist in stopping the leaks. . . . Little leaks, carelessness and indifference are the basis of many claims. Stop the leaks and you stop the claims. . . . If you think a penny is too small an item for your consideration you can help to save the dollars." Here follow the subjoined rules:

When furnishing cars to shippers for loading see that they are in first-class condition and clean.

For grain and flour loading see that cars are swept out and that they have not previously been used for oil, lime, coal or like commodities.

For grain loading see that grain doors are tight and no holes in floor or sides.

For live stock see that old manure is cleaned out, thereby cutting out the dead weight. If there are drinking troughs see that they are clean and in usable condition.

In order to prevent overheating in summer or freezing in winter, care should be taken to see that refrigerating and ventilating appliances are in good working order, before perishable freight is loaded into refrigerator cars.

See that all freight is in good order when received and that it checks as to quantity for which receipt is given.

See that it is billed out promptly and not unnecessarily delayed enrote.

See that L C L freight is loaded into proper cars, in order to expedite delivery and to avoid stray shipments, and that it is properly stowed in cars to avoid damage by shifting.

Avoid rough handling of freight. This applies to single packages in warehouses as well as to carloads in yards or trains.

Deliver to consignees all freight received, if waybill calls for it, but look out for OVERS. Get full receipts. If damaged, keep proper record and make prompt report.

Our claim department is too busy. Help us to reduce the work or to abolish the department altogether.

N. B.—Station agents and baggagemen can save the pennies—and dollars too—by handling other peoples' baggage as they would like to have their own handled.

The Pennsylvania Safety Medal.

The medal which was awarded to the Pennsylvania Railroad Company last week, as noticed in the *Railway Age Gazette,* page 119, was given by the Travelers Insurance Company; and in accepting the medal on behalf of the railway company, Vice-president Atterbury said that to the Travelers Company should be accorded the credit of initiating on the Pennsylvania the systematic methods of industrial safety which have been followed by the officers and employees of the company during the time that this great improvement in safety has been made. Mr. Atterbury said that the medal would have great value as an incentive to the officers and employees of the road to still further achievement. It is the hope and intention of the officers to increase and extend the movement for greater safety. Alleged disregard of human life on the part of the American people is not a fundamental

characteristic, said Mr. Atterbury; it is rather the natural result of deficient education. Children should be trained in schools about this matter, thus making them instinctively cautious. We carefully step aside from a snake in the road and carefully avoid crossing a field in which there is a bull. This is instinctive caution. Children should be taught to be equally cautious at a grade crossing. One state already has directed its school teachers to instruct children between the ages of 6 and 14 regarding dangers from fire. A certain street car company has issued cards warning children how to get on and off cars. The value of such notices is not limited to the children; the influence reaches their parents. Mr. Atterbury again called attention to the fact that the railways, in their efforts to put a stop to trespassing, receive but little encouragement from the authorities who ought to enforce the laws.

American Wood Preservers' Association.

At the close of the convention of the Wood Preservers' Association, held in Chicago, January 16-18, the following officers were elected for the ensuing year: President, E. A. Sterling, forester, Pennsylvania Railroad, Philadelphia, Pa.; first vice-president, Amos Smith, superintendent Ayer & Lord Tie Company, Argenta, Ark.; second vice-president, H. M. Rollins, superintendent Gulfport Company, Gulfport, Miss.; third vice-president, Grant B. Shipley, president Pittsburgh Wood Preserving Company, Pittsburgh, Pa.; secretary and treasurer, F. J. Angier, engineer of timber preservation, Baltimore & Ohio, Baltimore, Md. The next convention will be held during the third week in January, 1913, at Chicago. The name of the association has been changed to the American Wood Preservers' Association.

The Air Brake Association.

The nineteenth annual convention of the Air Brake Association will be held at the Hotel Jefferson, Richmond, Va., May 7-10, 1912. The program includes the following papers and reports: Friction—Recent Tests of Brake Shoes, by R. E. Auger; The Cleaning Date, by C. P. McGinnis; The Westinghouse P. C. Equipment in Service, by T. F. Lyons; Report of the Committee on Air Hose Failures, by T. W. Dow, chairman; The New York L. T. Equipment, by O. E. Moore; Right-Angled Pipe Fittings in Air Brake Service, by T. L. Burton; Report of the Committee on Recommended Practice, by S. G. Down, chairman; The Westinghouse P. C. Equipment, Questions and Answers, by S. J. Kidder; stereoptican lecture on Recent Air Brake Developments, by W. V. Turner.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; annual May 7-10, Richmond, Va.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.; annual, May 10-11, San Francisco, Cal.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, Seattle, Wash.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Chicago.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago. Convention, June 17-19, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y., N. H. & H., New Haven, Conn.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912. Los Angeles, Cal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conrad, 75 Church St., New York.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago. Convention, May 22-25, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Convention, 2d week in September.

NATIONAL RAILWAY APPLIANCES ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Convention, May 20-22, Buffalo, N. Y.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling; September, 1912, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSFORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month except July and August, Chicago.

Traffic News.

The charter of the Globe Express Company, operating over the Denver & Rio Grande and Western Pacific, has been renewed for 20 years.

Members of the Indianapolis Trade Association are going on a "trade extension" excursion through the southern states and to Cuba; and they think of taking along a few Indiana made automobiles, as samples of what they have to sell.

At Memphis, Tenn., last week, there was a meeting of cotton shippers and bankers to protest against the continuance of the "Liverpool plan," under which bills of lading for cotton are sent through a recording office in New York City to be validated.

The Minneapolis, St. Paul & Sault Ste. Marie and the Canadian Pacific have filed tariffs from Saskatchewan adjusting rates on wheat and oats in order to give Minneapolis and Duluth the same rates as those now in effect to Fort William and Port Arthur.

The Panama Railroad and the Panama Steamship Line, both owned by the United States government, have announced new freight tariffs, to go into effect February 4, by which rates on most commodities passing across the Isthmus of Panama are increased.

The number of vessels passing through the Suez Canal last year was 4,969, and the receipts of the canal amounted to 134,010,000 francs ($26,802,000). The dredging of the canal to a depth of 35 ft. (4 ft. deeper than the former level) has been almost finished.

Since January 1 on the Union Pacific ticket refunds have been handled by the passenger department instead of by the auditor of passenger accounts as in the past. Drovers' tickets hereafter will be issued by the general passenger department instead of by the general freight department.

The St. Louis railways have appointed a committee of seven to consider the demands of the Business Men's League of St. Louis for a readjustment of the rates on coal from Illinois mines to St. Louis and East St. Louis. The bridge arbitrary now creates a difference of 20 cents in favor of East St. Louis.

The agricultural instruction trains of the Canadian Pacific are to be increased in both number and size and the plans for their management include all important sections of the territory traversed by the company's lines. Moreover, the lecturers will give instruction on household economy, care of sick persons and other subjects of interest to women.

The Missouri Pacific, in connection with the Chicago, Milwaukee & St. Paul, has established a new package car service between Milwaukee and Kansas City, making third morning delivery at the latter point. Similar new service has been established by the two roads from Chicago to Kansas City and Wichita, making fourth morning delivery at Wichita.

The electric trains running between Church street, New York, and Park Place, Newark, N. J., over the Hudson & Manhattan and the Pennsylvania, will hereafter on Sundays be run at intervals of 10 minutes throughout the day from 6:30 a. m. and until midnight. Heretofore these trains on Sunday have run only half as often. The traffic between New York and Newark by these trains both week days and Sundays has shown a very large increase.

The Railway Ticket Protective Bureau has issued a circular letter giving the syllabus of a comprehensive opinion delivered by the supreme court of Colorado dealing decisively with features and conditions commonly urged in courts of law in defense of the business of ticket scalping. In the case of Kirby et al. versus Union Pacific the court held that "A railway company may lawfully issue tickets which are not transferable by the owner. The condition which prohibits transfer is a legal contract, and the railway company is under no obligation to carry a person presenting such tickets unless he is in fact the original purchaser. Such tickets are not property in the hands of the purchaser in such sense that they can be sold. Dealing therein is a fraud both upon the railway and the traveling public and cannot be made a legitimate business. A railway ticket is a mere token to show that the person properly in possession of it had paid his fare. If transferred in violation of its terms it is no longer property in any sense, but is as much under ban of the law as counterfeit money. One who prosecutes a lawful business has a property therein, and is entitled to protection against unlawful interference therewith."

The Merchants' Association of New York, supported by the Chamber of Commerce and other organizations, and also by officers of the state and of the city, has again appealed to the Interstate Commerce Commission to order the abolition of the differentials by which export and import freight moving through Boston, Philadelphia and Baltimore is carried by trunk line railways at lower rates than those charged on shipments through New York City. A petition, accompanied by elaborate statements and arguments, was laid before the commission this week. Representatives of New York, in presenting their case, said that it was necessary to make rates which would take export flour through New York, for the reason that without the New York brand the flour trade in Latin-American countries could not be held. Merchants in those countries not only demand the New York trademark, but also depend on the long-time credits which they get in New York. Canada and Argentine are now strong competitors in the wheat and flour trade. Commissioner Clark asked whether the rates to New York should be reduced or those to other ports increased, and was answered that the change should be made by a reduction, thus increasing the export trade. Testimony was given to the effect that burlaps for export now go to Baltimore rather than to New York. Corn apparently has an advantage at Baltimore, not only of a lower rate over the railways, but also by reason of certain rules of the Baltimore Board of Trade. The tramp steamers go to Baltimore and merchants in that city are able to sell grain in Germany cheaper than it can be bought of New York dealers.

Bolivian Railway Company's Construction.

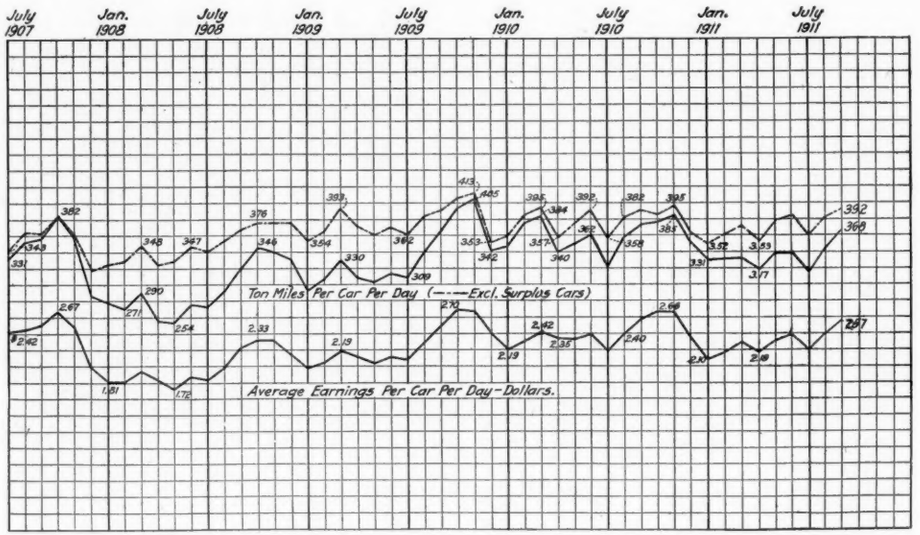
The main line of the Bolivian Railway Company's road to Potosi has been completed from Rio Mulatos to kilometer 80, and from Potosi to kilometer 33. There have been completed 197 culverts and 62 bridges, the station at Rio Mulatos has been erected, and the telegraph line extended to kilometer 136. Over 1,500 laborers are engaged in construction work, and 32 miles of the railway line still remain unfinished. The new line to Cochamba has been staked off to kilometer 107. Grading has been finished to kilometer 60, and grading work is actively progressing between kilometers 60 and 107. Ballasting has been finished up to kilometer 21, and is being pushed forward between kilometers 21 and 60. Track has been laid to kilometer 55, and the telegraph line is in operation to kilometer 93. Over 3,500 workmen are employed in the construction of this line, and preliminary work is being undertaken between kilometers 85 and 107. No active work has been done on the remainder of the road covering a distance of about 72 miles. The line to Tupiza is staked up to kilometer 86, and grading is being done over this part of the right of way. Over 500 workmen are employed in the construction of this line. The line to Yungas has been definitely surveyed to kilometer 67, and active preparations are being made for pushing construction as fast as possible.

Freight Car Balance and Performance.

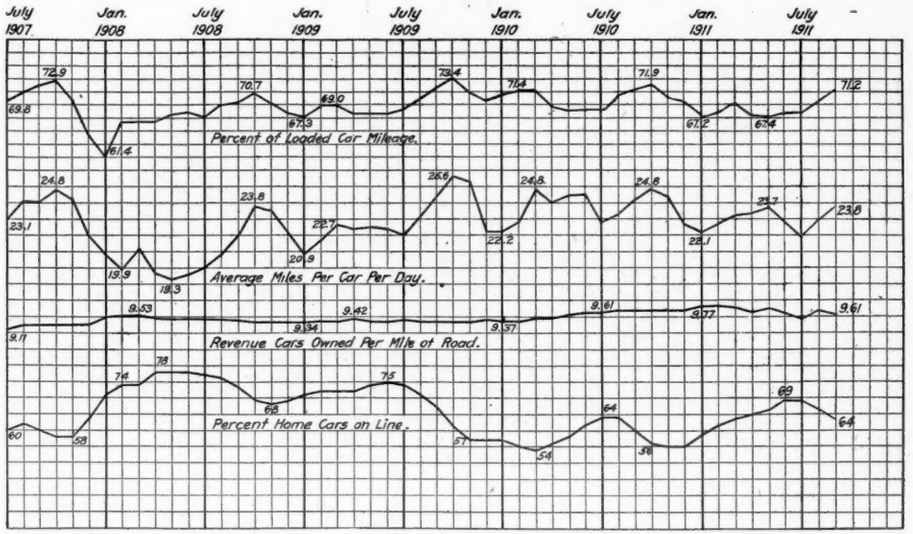
Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 112, covering car balance and performance for September, 1911, says:

"An improvement in the traffic conditions during the month of September, 1911, is shown by increases in all but one of the performance averages. The averages are slightly under those of one year ago. The only average which did not increase is average ton miles per loaded car, that figure remaining the same as in the previous month. The average miles per car per day for September, 1911, is 23.8 miles, an increase of 0.9 miles over August, 1911, but 0.4 miles under the average for September, 1910.

"The per cent. of loaded mileage increased from 69.6 per cent. in August, 1911, to 71.2 per cent, in September, 1911, an increase of 1.6 per cent. The average ton miles per loaded car mile remained the same (21.6) for August and September, 1911, but the average ton miles per car mile and average ton miles per car per



Average Car Earnings and Mileage.



Monthly Car Performance.

CAR BALANCE AND PERFORMANCE IN SEPTEMBER, 1911.

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	87,471	498,154	214,008	182,934	173,493	391,632	18,597	136,084	29,486	143,848	81,553	1,957,260
Average number of system cars on line	48,338	314,623	136,405	110,869	102,791	278,256	7,079	88,907	24,679	65,669	74,686	1,252,302
Railway-owned cars: Average foreign on line	44,958	161,984	95,016	57,325	52,482	122,492	11,484	48,372	19,212	56,121	37,826	707,272
Total Railway-owned cars on line	93,296	476,607	231,421	168,194	155,273	400,748	18,563	137,279	43,891	121,790	112,512	1,959,574
Excess	5,825	.....	17,413	.....	.....	9,116	.....	1,195	14,405	.....	30,959	2,314
Per cent. of cars on line to total owned;												
Home	55	63	64	61	59	71	38	65	84	46	92	64
Foreign	51	33	44	31	30	31	62	36	65	39	46	36
All railways	106	96	108	92	89	102	100	101	149	85	138	100
Private cars on line	3,786	32,532	12,456	2,628	6,425	14,907	2,063	8,251	3,776	10,834	3,209	100,867
Total, all cars on line	97,082	509,139	243,877	170,822	161,698	415,665	20,626	145,530	47,667	132,624	115,721	2,060,441
Per cent. of cars in shop	7.98	8.21	9.44	6.43	9.33	6.21	7.03	8.02	5.25	5.79	7.61	7.64
No. of freight engines owned	1,415	7,775	3,072	3,093	2,712	6,339	525	2,671	760	2,683	2,151	33,196
Average cars on line per freight engine owned	69	65	79	55	60	66	39	54	63	49	54	62
Total freight-car mileage	53,765,536	505,240,117	151,958,132	123,833,222	120,029,112	307,271,980	32,260,496	91,008,340	32,696,059	119,037,538	94,669,928	1,631,770,460
Average miles per car per day	18.5	22.3	20.8	24.2	24.7	24.6	52.1	21.8	22.9	29.9	27.3	23.8
Per cent. loaded mileage	74.3	68.7	70.8	68.8	72.4	72.4	71.0	72.7	73.4	74.6	74.9	71.2
Ton-miles of freight, including company freight	618,243,381	8,270,772,011	2,419,689,864	2,014,780,851	1,661,177,861	2,706,277,971	447,668,168	1,282,637,315	352,406,252	1,760,375,528	1,327,115,989	22,861,145,191
Average ton-miles, including company freight:												
Per car-mile	11.5	16.4	17.1	16.3	14.0	14.7	14.5	14.1	12.7	15.0	14.1	15.4
Per loaded car-mile	15.5	23.9	23.9	23.7	19.3	20.3	20.4	19.6	17.3	20.1	18.7	21.6
Per car per day	212	387	356	393	349	359	806	308	298	448	385	368
Gross freight earnings	$6,801,456	$51,319,922	$14,391,033	$12,173,485	$11,902,827	$32,454,006	$3,503,492	$11,381,073	$4,142,560	$16,667,354	$9,150,906	$173,889,014
Average daily earnings: Per car owned	$2.59	$2.47	$2.24	$2.22	$2.29	$2.76	$6.28	$2.70	$4.68	$3.86	$3.77	$2.71
Per railroad car on line	2.43	2.58	2.07	2.41	2.56	2.70	6.29	2.67	3.15	4.56	2.73	2.71
All cars on line	2.34	2.41	1.97	2.38	2.45	2.60	5.66	2.52	2.90	4.19	2.65	2.57

day increased 0.4 and 18 ton miles respectively. The average daily earnings for all cars on line increased from $2.39 in August, 1911, to $2.57 in September, 1911, and the same item excluding surplus cars increased from $2.61 in August, 1911, to $2.72 in September, 1911."

The accompanying charts show monthly car earnings and performance in 1907 to 1911, and the table gives car balance and preformance figures for September.

INTERSTATE COMMERCE COMMISSION.

The commission will hold a hearing in Chicago on January 29 to investigate the changes made in the Western Classification by issue No. 51, which has recently been filed to take effect February 15.

The commission has suspended until May 23, certain tariffs presented by transcontinental railways showing increased rates on hops from the North Pacific Coast terminals to the Atlantic seaboard.

The commission has suspended until May 24, tariffs presented by various railways showing increases in the rates on freight from Cincinnati and other points, to places on the Carolina, Clinchfield & Ohio.

Special Examiner Mackley called a hearing at Topeka, Kan., on January 19, on the complaint of the Kansas railway commission and several intervening shippers, alleging discriminations in freight rates from Mississippi river points to interior Kansas points.

Commissioner James S. Harlan began a hearing in Chicago on January 19 on the complaint of the Colonial Salt Company of Akron, Ohio, and nine other independent salt companies, involving the joint rates on salt made by the railways in connection with the Michigan, Indiana & Illinois line and the Ludington Transportation Company, operating steamship lines on the Great Lakes, and said to be controlled by the Morton Salt Company. The complaint brings into question the legality of the divisions paid to the steamship lines for the haul across the lakes from the points of origin of the salt to Milwaukee and Chicago, where the salt is stored under transit privileges and then shipped out by rail to the ultimate points of destination.

Rates on Crude and Gas Oil Equalized.

Sun Company v. Indianapolis Southern et al. Opinion by Commissioner Clark.

The rule in western classification, which estimates gas oil at substantially less than its actual weight and crude oil used for the same purpose at as much or more than its actual weight, is found to be unreasonable and reparation is awarded. (22 I. C. C., 194.)

Discrimination Against Paducah.

Paducah Cooperage Co. v. Nashville, Chattanooga & St. Louis. Opinion by the Commission.

Rates on stave and heading bolts to Paducah, Ky., found to be unreasonable to the extent that they exceed rates between local points of the N. C. & St. L. for similar distances. (22 I. C. C., 226.)

Rates on Canned Goods Equalized.

Empson Packing Co. v. Colorado Midland et al. Opinion by the commission.

Rates on canned goods from Colorado to Pacific coast terminals is 80 cents per 100 lbs. and is found to be reasonable, but rates from the same points to California terminals of 85 cents is found to be unreasonable, insofar as it exceeds 80 cents. (22 I. C. C., 268.)

Rate from Whiteland, Ind., Reduced.

Whiteland Canning Co. v. Pittsburgh, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Prouty.

Advanced rates on evaporated milk from Whiteland, Ind., to central freight association territory refused, because the railways fail to sustain the burden of proof to show the reasonableness of new rates. (22 I. C. C., 261.)

Minneapolis-Denver Rate Reduced.

Minneapolis Traffic Association v. Chicago, Burlington & Quincy et al. Opinion by Commissioner Prouty.

The complaint is that class rates from Minneapolis, Minn., to Denver, Col., are discriminatory as compared with class rates from St. Louis, Mo., and Chicago. The vice-president of the Union Pacific made no serious opposition to the complaint, but says that the rates asked for had not been granted, since it would constitute an acquiescence in the principle announced by the commission in the so-called Kindel case which reduced the rates from St. Louis and Chicago to Denver. The commission ordered the Minneapolis rates reduced. (22 I. C. C., 259.)

Walsenburg Coal Rate Order Amended.

Colorado Coal Traffic Association v. Atchison, Topeka & Santa Fe et al. Opinion by the commission.

The commission's order in 17 I. C. C., 479, establishing through rates on coal from Walsenburg, in Colorado, to points on the A. T. & S. F., excluded 77 points in Kansas and points in Texas and Oklahoma. The commission now refuses to extend its order to the 77 points in Kansas, but holds that the defendants should establish through rates to points in Oklahoma and Texas comparable with those ordered by the commission in the case above referred to. (22 I. C. C., 264.)

Reparation Awarded.

De Camp Brothers & Yule Iron, Coal & Coke Co. v. Virginia & Southwestern et al. Opinion by the commission.

Where a joint rate was improperly published and concurrence had not been obtained from the other carriers by the initial carrier, complainant is entitled to reparation from the initial carrier. (22 I. C. C., 274.)

Complaint Dismissed.

R. W. Silvester et al. v. City & Suburban Railway of Washington et al. Opinion by the commission.

The commutation fares on the electric line between Washington, D. C., and Laurel, Md., not found to be unreasonable. (22 I. C. C., 201.)

Heath Hardware Co. et al. v. Pennsylvania Railroad et al. Opinion by the commission.

The rates charged on certain shipments of sheet iron and iron wire fencing from Youngstown, Ohio, to Monroe, N. C., and from Monessen, Pa., to Lawrenceville, Va., although higher than they would have been if southern classification ratings had applied, were materially lower than if official classification ratings had applied and are not found to be unreasonable. (22 I. C. C., 223.)

Marion Iron & Brass Bed Co. v. Toledo, St. Louis & Western et al. Opinion by the commission.

The fact that the defendant's tariffs do not provide that in case of a mixed carload shipment, where the sum of the carload rate on one or more of the articles and the L. C. L. actual weight rate on the remainder of the article is less than the mixed carload rate, the lower rate should be charged, is not unreasonable. (22 I. C. C., 272.)

M. A. Kennedy & Co. v. St. Louis Southwestern et al. Opinion by the commission.

A rate of 34 cents per 100 lbs. was named between St. Louis, Mo., and Monroe, La., but the delivering line was not named as a participant. At the same time there was a rate of 40 cents in which all the railways had concurred. The complainant having suffered no damage, and the 40-cent rate being found lawful and reasonable, the complaint is dismissed. (22 I. C. C., 277.)

Chamber of Commerce of City of Augusta v. Southern Railway et al. Opinion by the commission.

The rate of $2.10 per ton on coal from Coal Creek mines, in Tennessee, to Augusta, Ga., is not found to be either unreasonable or discriminatory. (22 I. C. C., 233.)

Brook-Rauch Mill & Elevator Co. v. St. Louis, Iron Mountain & Southern et al. Opinion by the commission.

Charges for necessary out-of-direct-line service on shipments of grain not found to be unreasonable. (22 I. C. C., 249.)

Fairmont Creamery Co. v. Chicago, Burlington & Quincy. Opinion by the commission.

The rate on cream from Concordia, Kan., to Crete, Neb., not unreasonable. (22 I. C. C., 252.)

Edwin D. Johnson v. Minneapolis, St. P. & Sault Ste. Marie. Opinion by the commission.

The complaint is as to service taking place wholly within Wisconsin, and the state commission and not the I. C. C. should pass on the complaint. (22 I. C. C., 255.)

Readjustment of Arizona Rates.

Maricopa County Commercial Club v. Santa Fe, Prescott & Phoenix et al. Opinion by Commissioner Lane.

Advanced rates on barley, bran and wheat from Phoenix, Ariz., to other points in Arizona are found to be unreasonable and new rates are prescribed. (22 I. C. C., 216.)

Maricopa County Commercial Club v. Phoenix & Eastern et al. Opinion by Commissioner Lane.

Rates on condensed milk from Creamery, Ariz., to points on the Atchison, Topeka & Santa Fe found to be unreasonable and new rates are prescribed. (22 I. C. C., 218.)

Same v. same. Opinion by Commissioner Lane.

Rates on coal from Gallup, N. Mex., to Tempe, Ariz., and Mesa are found unreasonable and new rates are prescribed. (22 I. C. C., 221.)

Maricopa County Commercial Club v. Maricopa & Phoenix Railroad et al. Opinion by Commissioner Lane.

Class rates from El Paso to Arizona found to be unreasonable. (22 I. C. C., 279.)

Discrimination Against Louisville.

Norman Lumber Co. et al. v. Louisville & Nashville et al. Opinion by the commission.

It is claimed that the rates on hardwood lumber into and out of Louisville are such as to give the lumber dealer at Memphis and at Cairo, Ill., an undue advantage over the lumber dealer at Louisville. The commission, since it has fixed the rate relation between Memphis and Cairo in previous cases, finds that it can settle the Memphis-Louisville question by an adjustment of the Cairo-Louisville rates. It is found that the rates to Louisville are higher than those to Cairo, and the defendants fail to justify this difference, and discrimination is found against Louisville.

Complaint is also made that since one cent per 100 lbs. is charged on northbound shipments for bridge service, Louisville dealers ought to pay one cent less on inbound shipments from southern lines than is paid by dealers on the north bank who are reached by the southern lines. The commission upholds the contention that Louisville, on the south bank of the river, ought not to pay inbound a rate which is sufficient to cover the transportation of traffic to the north bank of the river, and then when reshipping the traffic to the north, again pay an amount sufficient to cover the transportation across the bridge. The commission does not make an order at present, however, because of the difficulties in entering such an order. (22 I. C. C., 239.)

Commission Investigates Manufacturers' Railway.

Special Examiner Mackley, of the Interstate Commerce Commission, held a hearing in St. Louis last week on the question of the right of the Manufacturers' Railway, controlled by the Anheuser-Busch brewing interests, to receive divisions of through earnings from the trunk line railways entering St. Louis, in the form of a switching allowance. The commission after a formal hearing last year held that the payment of the allowance was not unlawful, but made no order, pending a further hearing.

President G. F. Moore and other witnesses for the railway defended the allowance, on the ground that the road handled a large amount of other traffic, and said that application had been made for membership in the American Railway Association. Milton H. Smith, president of the Louisville & Nashville, testified that in his opinion the absorption by the trunk lines of a $4.50 switching allowance to the Manufacturers' Railway amounted to an illegal rebate to the brewery company and a discrimination against other shippers. He believed it also illegal for the roads to issue passes to the officers of the brewery company or to officers of the Manufacturers' Railway.

As an example, he cited a shipment of ten cars from the brewery to Memphis over the Louisville & Nashville, on which the total revenue was $391.60, at 16 cents per 100 lbs., of which $4.50 per car, or $45, was paid to the Manufacturers' Railway for the "alleged service" of delivering the loaded cars to the tracks of the Wiggins Ferry Company. This allowance or "rebate," he said, amounted to 11½ per cent. of the total revenue for a movement over a track 4,000 ft. long (the Manufacturers' Railway), while the L. & N. bore the cost of moving the traffic from the point of interchange with the Wiggins Ferry Company to Memphis, a distance of 477 miles, including the crossing of four rivers, besides furnishing the terminal facilities at Memphis. This constituted a discrimination, in his opinion, in favor of the Anheuser-Busch Brewing Association against 21 other breweries in St. Louis and East St. Louis. Mr. Smith also testified that to pay allowances on traffic other than that of the brewery was, in his opinion, a discrimination against industries located at points where their shipments must be moved by street vehicles between their plants and the railway receiving stations. A further hearing in the case is to be held.

Division of Through Rate Not Criterion of Local Rate.

Railroad Commissioner of Nevada v. Nevada-California-Oregon Railway and Sierra Valleys Railway. Opinion by Commissioner Lane.

It is claimed by the Railroad Commission of Nevada that there is discrimination against Reno because the local rates from Reno to points on the defendant's lines are higher than the division of the joint rate from Sacramento or San Francisco for the same hauls, and it is also claimed that the local rates from Reno are unreasonable in themselves. It is urged in this case that since through freight must all be transferred at Reno, there is not the usual excuse for a lower division of a through rate than for a local rate. The commission, however, believes that the general principles remain that a through rate may be lower than the sum of the locals, although the cost of service is the same, if the lower through rate is forced by competition which does not affect the local rates. Competition is clearly shown in this case. It is not found that the local rates from Reno are unreasonable *per se*.

In conclusion it may be pointed out that the real basis of the complaint is the fact that Reno merchants find it impossible to compete with Sacramento traders in markets which geographically may be said to belong to Reno. This complaint has much merit, but no reduction in the local rates of the Nevada-California-Oregon Railway can overcome the disadvantage under which Reno labors. The real difficulty lies in the transcontinental commodity rates to Reno. The commission has considered these in another proceeding. The relief therein proposed would enable Reno to get its share of the business along the Nevada-California-Oregon Railway, and no other action by the commission can have this effect.

The complaint will be dismissed. (22 I. C. C., 205.)

STATE COMMISSIONS.

The Illinois Railroad Commission in the case of the West Side Packing Company of East St. Louis v. the Vandalia, decides that the railway cannot charge for car rental in addition to switching charges.

The South Dakota railway commission has petitioned the Interstate Commerce Commission to allow special half rates for the transportation of seed grain to South Dakota districts that suffered from drought last spring.

The California railway commission and many shippers on the Pacific coast have sent telegrams to the Secretary of War and to the California senators, protesting against the proposed advance in westbound freight rates by the Panama Railroad. The rates were to have gone into effect January 1, but were postponed by the Secretary to February 4. He is now asked to postpone the advance again, to allow the coast shippers to present arguments.

Indiana Headlight Law.

The Indiana Commission has filed in the Federal court a bill of exceptions protesting against the finding by Special Master N. C. Butler, handed in to the court last month, in the case involving the headlight law. The master reported to the court that the order issued by the commission a year ago requiring railways to equip locomotives with headlights of not less than 1,500 candle power, was legal in the sense that the commission had power in the premises, but that it was invalid because its

provisions were not sufficiently definite. The commissioners claim that their order is sufficiently definite for use as a basis of action until the status of the law can be settled in the courts.

The part of the order which the special master finds does not have the certainty and definiteness required in a penal statute or order is that part which provides that the railways shall equip the engines "with headlights of not less than 1,500 candle power." He points out that locomotive headlights have an initial source of light and also have reflectors, which gather and concentrate the rays of light that otherwise would be emitted in all directions. The order of the commission does not contain any provision with reference to the dimensions or use of reflectors, or the spread of light from them. While the initial lights contained within two separate headlights might be of exactly the same candle power, one light might be far more brilliant and effective than the other, because of difference in the shape, size, material or character of the reflector which is part of the headlight. The master says, also, that the commission's order does not indicate the point at which the measurement of the candle power should be made. Illustrations of the variation in the measurement of apparent or equivalent candle power at different distances are given in the master's report.

Another question before the master was whether the road should have applied to the commission for a rehearing before beginning its suit in the Federal court. The master finds in favor of the railways on this matter.

"Operation of a railway is a hazardous business," said the master, "and it is more hazardous at night than it is by daylight. If the commission, after having investigated the subject, is of the opinion that in more light on the track there is greater safety, and gives expression and effect to that opinion by an order for headlights of a higher power than such as are now in use, it can not be said that the order is wholly unconnected with the protection of persons and property, which is the avowed purpose of it."

This language is followed by the conclusion of law that the order of the commission in the headlight matter is not an arbitrary and unreasonable exercise of power. The master also found that the act of 1909, on which the order was based, was not a delegation of legislative power.

COURT NEWS.

The Supreme Court of the United States has set the intermountain rate cases, on which an appeal by the Interstate Commerce Commission was taken from the injunction granted by the Commerce Court, for hearing on February 19.

The Baltimore & Ohio and other railways have petitioned the Commerce Court at Washington for an injunction forbidding the Interstate Commerce Commission to enforce its order requiring a freight connection to be made with an electric line at Madeira and Hillsboro, Ohio.

In the United States district court at Buffalo, N. Y., on Tuesday of this week, Judge Hazel fined the Standard Oil Company $55,000 for 143 violations of the law in accepting illegal rates on oil from Olean, N. Y., to Burlington, Vt. The offences were committed in 1904 and 1905; and the case has been in the courts several years. The railways, the Pennsylvania and the New York Central, some time ago paid fines of $35,000 and $20,000 respectively.

The Illinois Brick Company has filed a suit in the superior court at Chicago against the Baltimore & Ohio Chicago Terminal to collect $60,000 damages for alleged unjust rates on shipments of brick from Chicago Heights to Chicago between January 20, 1910, and August 31, 1911. The suit arises from an alleged agreement between the Chicago Terminal Transfer Railway, which the Baltimore & Ohio purchased at a foreclosure sale, and the Chicago Heights Land Association, providing for reductions in rates on all shipments from Chicago Heights. The amount of the alleged overcharge is $16,000.

The Supreme Court of the United States in a decision by Justice Lurton, handed down this week, in a case against the Louisville & Nashville, declares unconstitutional, so far as it affects interstate traffic, the law of Kentucky, passed in 1906, forbidding the transportation of intoxicating liquors into districts in that state where the sale of such liquors is forbidden. The railway company refused to carry such shipments from Indiana, basing its refusal on the terms of the Kentucky law. The Federal court in Indiana enjoined the railway on the ground that the Kentucky statute, in violation of the constitution, attempted to regulate interstate commerce. The Court of Appeals affirmed this decision, and it is now sustained by the Supreme Court. Justice Lurton approved the action of the plaintiffs in this case in appealing to the courts rather than to the Interstate Commerce Commission. The commission has jurisdiction over administrative questions and matters of fact, but the courts must deal with questions of general law.

The appellate division of the supreme court of New York last week affirmed a judgment against the Postal Telegraph Company for $39,409.74 damages for an error in a telegram. The message was an order to sell cotton at "12.70," but was delivered reading "1207", and the senders, Stephen N. Weld & Company, claim that they lost $27,565. This was in 1906, and the case has been pending in the courts since that time. The suit had to be tried a second time because the first trial was set aside on the ground that the jury ought to have been allowed to decide whether the message was a part of a gambling transaction. The present decision is by Justices Clarke, Scott and Miller. Justice Ingraham dissents; and Justice Laughlin also dissents, because of a difference of opinion as to whether the telegraph company should have repeated the message. A request to charge that the defendant should have repeated the message was made at the trial by counsel for the plaintiffs, to which an exception was allowed to counsel for the telegraph company. Justice Clarke, in presenting the majority opinion of the Appellate Division, says of the question of repeating a message:

"I have reached the conclusion that, in view of the main charge and the previous request of the defendant, the charging of this request was not reversible error. The case was not being tried upon any specific item. It was in evidence that on the figure '20,' there had been such misunderstanding between the two operators that New York had been asked to 'confirm' and had done so, and when this last request used the language 'confirm or repeat,' I do not think that it can be held that it referred to the full form of repeating a message, which had been testified to as meaning the rehandling of the message by four operators instead of two, for which the sender paid extra, but rather meant to confirm or repeat as between the operators, which had been shown in many instances to have been the custom for their mutual understanding."

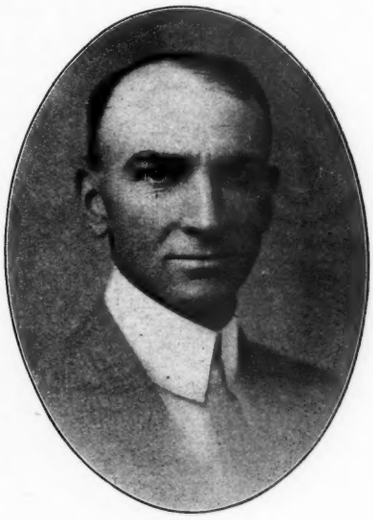
The Southern Pacific, the Corvallis & Eastern and the Independence & Monmouth have filled a petition in the Commerce Court, asking that the order of the Interstate Commerce Commission of June, 1911, in the Willamette Valley lumber case, be set aside. The petition alleges that the commission has in effect overruled the Supreme Court of the United States by its order. The rate on lumber from the Willamette Valley and Portland to San Francisco and Bay points for many years was $3.10 a ton, and in April, 1907, it was advanced by the carriers to $5. On complaint of the Western Oregon Lumber Manufacturers' Association and others, the commission fixed rates of $3.40 and $3.65. The Supreme Court held that the record made the conclusion inevitable that the complaint was directed not so much against the reasonableness per se of the $5 charge as against an increase in a rate long maintained. In a later proceeding the commission, last June, fixed the rates ten cents higher, $3.50 and $3.75. On this point the petition says: "The amount of the increase above the former rates is insignificant, and petitioners believe and so charge that it was not made by the commission for the purpose of making such rates reasonable in themselves for the services rendered, but was solely to make some variation from the former rates, while at the same time substantially retaining those rates for the reasons set forth in their former opinion. The commission, though advised of the opinion and decree of the Supreme Court, did not accept and act upon them according to their true intent and meaning, according to which, as petitioners are informed and believe, they should have set aside their order of suspension and left in effect the said rate of $5; but rendered their opinion and made their order, by which, either from a misconstruction of the true intent and meaning of the opinion and decree of the Supreme Court, or arbitrarily, they, as petitioners are informed and believe, in effect, overruled the Supreme Court of the United States."

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

O. W. Dynes, whose appointment as commerce counsel of the Chicago, Milwaukee & St. Paul and the Chicago, Milwaukee & Puget Sound, with office at Chicago, has been announced in these columns, was born May 31, 1869, at Columbus, Wis. He was educated at the Oshkosh (Wis.) Normal School and at Cornell University, and for fourteen years was engaged in the general practice of law at Chicago, representing principally corporation interests. Mr. Dynes was made assistant general solicitor of the Chicago, Milwaukee & St. Paul in May, 1907, which position he held at the time of his promotion as above noted.



O. W. Dynes.

Clarence F. Parker, purchasing agent of the Illinois Central at Chicago, has been elected vice-president in charge of purchases and supplies, with headquarters at Chicago, a new office. Mr. Parker was born February 14, 1865, at Charleston, Ill. He was educated at Washington University, St. Louis, Mo., and from 1888 to 1896 held various positions in train service, having been car accountant, secretary to the general manager and purchasing agent, and assistant general manager and purchasing agent of the St. Louis, Alton & Terre Haute, now part of the Illinois Central. He was general manager from January to April, 1896; on the latter date he became general agent of the Illinois Central at St. Louis, and in May, 1902, was promoted to coal traffic manager. From June, 1904, until his recent election as vice-president he has held the office of purchasing agent.

C. F. Parker.

Operating Officers.

Andrew Ross, superintendent of the Old Colony division of the New York, New Haven & Hartford, with office at Taunton, Mass., has resigned.

R. L. Barrett has been appointed trainmaster of the Brunswick division of the Atlanta, Birmingham & Atlantic, with office at Fitzgerald, Ga., succeeding G. F. Dickson, resigned.

Harry B. Sargent, chief clerk to the president and general manager of the New Orleans & Northeastern, the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, has been appointed superintendent of transportation, with office at New Orleans, La., succeeding E. A. Kelley, appointed general manager of the New Orleans Terminal Company.

R. F. Carr has been appointed superintendent of the Red River division of the St. Louis & San Francisco, with office at Francis, Okla., succeeding S. H. Charles, resigned. Effective February 1.

E. G. Evans has been appointed master of trains of the Louisville & Nashville and subsidiary lines, in charge of the territory from Boyles, Ala., to Anniston, and from Anniston to Calera, with office at Anniston, succeeding P. E. Kemp, trainmaster at Anniston, resigned.

E. A. Kelley, superintendent of transportation of the New Orleans & Northeastern, the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific at New Orleans, La., has been appointed general manager of the New Orleans Terminal Company, with office at New Orleans, succeeding R. B. Fowler, resigned to become superintendent of the St. Louis, Brownsville & Mexico.

Under a change which has been made in the division of duties of the operating and transportation departments of the Texas & Pacific, effective February 1, Page Harris, assistant general superintendent at Dallas, Tex., has been appointed superintendent of transportation, with office at Dallas. J. W. Everman, general superintendent, will have supervision over operating matters.

P. W. J. Smith, passenger trainmaster of the New York, New Haven & Hartford on the division between New Haven and New York, has been appointed superintendent of the New York, Westchester & Boston, with temporary office in New York city. H. J. Reynolds, trainmaster in charge of freight service west of New Haven, succeeds Mr. Smith, and E. E. Regan, assistant trainmaster on the Shore Line division, has been appointed acting trainmaster in charge of freight service between Woodlawn and New Haven, including the Danbury, Ridgefield and New Canaan branches.

Traffic Officers.

H. H. Smith has been appointed traveling freight agent of the Virginian Railway, with office at Cincinnati, Ohio.

John E. Windsor has been appointed coal traffic manager of the Chicago, Terre Haute & Southeastern, with office at Chicago.

C. P. Gaither has been appointed contracting freight agent of the Seaboard Air Line, with office at New York, succeeding C. I. Malone, transferred.

H. C. Maggard has been appointed soliciting freight agent of the Trinity & Brazos Valley, with office at Houston, Tex., succeeding S. H. Shire, resigned to engage in other business.

John T. Bowe, formerly general agent of the Denver & Rio Grande at Chicago, has been appointed traffic manager of the Pullman Company, with office in the Pullman building, Chicago.

William Pedrick, Jr., district passenger agent of the Pennsylvania Railroad at Philadelphia, Pa., has been appointed assistant district passenger agent, with office at New York, and Roy A. Stall, traveling passenger agent, succeeds Mr. Pedrick, with office at Philadelphia.

W. V. Lifsey, assistant to the general eastern passenger agent of the New York Central & Hudson River at New York, has been appointed general eastern passenger agent, with office at New York, succeeding E. J. O'Hayer, resigned to go into other business, effective February 1.

Howard M. Morton has been appointed traveling freight solicitor, in connection with the Ironton, Ohio, agency, of the Star Union Line of the Pennsylvania Lines West. Charles A. Whittlesey has been appointed traveling freight solicitor, in connection with the Akron, Ohio, agency.

J. G. Royster, soliciting freight agent of the Mobile & Ohio at Kansas City, Mo., has been appointed traveling freight agent at that place. Joseph McDonough has also been appointed a traveling passenger agent, with office at Kansas City, and C. C. Harvey has been appointed soliciting freight agent.

W. D. Morgan, commercial agent of the Missouri, Kansas & Texas of Texas, at Denison, Tex., has been appointed commercial agent, with office at Dallas, Tex., a new position. Elbert Blair, commercial agent at Waco, Tex., succeeds Mr. Morgan, and O. C. Thomas, agent at Bonham, Tex., succeeds Mr. Blair.

T. J. Fitzgerald, passenger and ticket agent of the Missouri, Kansas & Texas at Kansas City, Mo., has been appointed passenger and ticket agent of the Missouri, Kansas & Texas of Texas, with office at Houston, Tex., succeeding A. S. Wagner, resigned to accept service with another company. B. R. Morton, passenger and ticket agent at St. Louis, Mo., succeeds Mr. Fitzgerald, and W. P. Overbay, district passenger agent at Detroit, Mich., succeeds Mr. Morton.

C. C. Clark, general agent in the passenger department of the Cleveland, Cincinnati, Chicago & St. Louis at Cincinnati, Ohio, has been appointed general agent in the passenger department of that road and the Michigan Central, with office at Chicago, succeeding I. P. Spining, resigned to go into other business. Ernest R. Whelan, city passenger agent at Cincinnati, succeeds Mr. Clark. W. L. Dewey, traveling freight agent of the C. C. C. & St. L., at Richmond, Va., has been appointed commercial agent, with headquarters at Norfolk, Va., and J. H. Meglemry, traveling freight agent at Birmingham, Ala., has been appointed commercial agent, with office at Atlanta, Ga. H. H. Squire has been appointed commercial agent, with headquarters at Detroit, Mich.

G. H. Corse, Jr., until November 15, 1911, general Oriental agent of the Chicago, Milwaukee & St. Paul, at Shanghai, China, has been appointed general passenger agent of the San Francisco Overland Route, a through passenger route made up of the Pacific Mail Steamship Company, the Southern Pacific, the Union Pacific, the Atchison, Topeka & Santa Fe, the Chicago & North Western, the Pennsylvania Lines and the New York Central Lines, and he will have his office at Yokohama, Japan. Mr. Corse began railway work in 1889, when he was about 16 years old, as relief operator on the Chicago & Iowa, now part of the Chicago, Burlington & Quincy; and for 15 years from 1891 was employed in various capacities in the traffic department of the Southern Pacific and the Union Pacific. He was made freight clerk of the Pacific Mail Steamship Company at Hong Kong, China, in 1906, and from April, 1909, until November of last year was general Oriental agent of the C. M. & St. P.

Engineering and Rolling Stock Officers.

L. E. Hassman, master mechanic of the Illinois Central, with office at Clinton, Ill., has resigned, effective February 1, to engage in other business.

The office of John D. Isaacs, consulting engineer of the Union Pacific and the Southern Pacific, was removed from Chicago to New York City, effective January 20.

A. H. Graham has been appointed master mechanic of the St. Louis, San Francisco & Texas and the Fort Worth & Rio Grande, with office at Sherman, Tex., succeeding C. E. Boss, resigned to accept service with another company.

B. F. Dye, roadmaster of the Norfolk & Western, has been appointed foreman in charge of construction work now in progress between Eckman, W. Va., and Welch, and R. M. Wilson has been appointed roadmaster of the Clinch Valley district, with office at Bluefield, W. Va., succeeding Mr. Dye.

T. N. Russell, general inspector in the car department of the Cincinnati, Hamilton & Dayton at Lima, Ohio, has been appointed superintendent of the car department, attached to the office of superintendent of motive power and car department at Cincinnati, Ohio. C. M. Hitch, general car foreman at Ivorydale, Ohio, has been transferred to Lima, in charge of freight and passenger car shops at that place.

C. K. Shelby, who has been appointed master mechanic of the Pennsylvania Railroad at Olean, N. Y., shops, as has been announced in these columns, was born on September 18, 1870, in Allegheny county, Pa., and after attending St. Paul's School, Concord, N. H., he was graduated from Lehigh University in 1892, with the degree of mechanical engineer. He entered the service of the Link Belt Engineering Company, and later went to the Baldwin Locomotive Works. In November, 1894, he became a special apprentice at the Altoona shops of the Pennsylvania Railroad, and was appointed assistant foreman of passenger car inspectors in February, 1899. One year later he was made assistant master mechanic at the Juniata shops, and in December, 1902, he was transferred in the same capacity to the Renova shops, and was acting master mechanic at those shops from May until June, 1903. Mr. Shelby was appointed assistant engineer of motive power of the Philadelphia & Erie Railroad division and the Northern Central Railway in July, 1903, with office at Williamsport, Pa., and was made master mechanic of the Elmira division of the Northern Central in April, 1906, which position he held at the time of his recent appointment as master mechanic of the Buffalo division.

Joseph A. Boyden, whose appointment as master mechanic of the Mahoning division of the Erie Railroad, with office at Cleveland, Ohio, has been announced in these columns, was born on September 2, 1876, at Susquehanna, Pa., and was educated at the high schools and at Wyoming Seminary. Mr. Boyden began railway work on November 6, 1892, at the Susquehanna shops of the Erie as an apprentice, and after completing his apprenticeship in 1896, he was for one year in the drafting room. In January, 1898, he went to the Pere Marquette as a machinist at Saginaw, Mich., and in February of the following year returned to the service of the Erie Railroad as a machinist at Susquehanna. In August, 1899, he was transferred in the same capacity to Dunmore, Pa., and in February, 1900, he was again transferred to the Baldwin Locomotive Works at Philadelphia, inspecting the engines being built for the Erie. He returned to the Susquehanna shops in September of the same year, and in January, 1901, was promoted to machine shop foreman at Port Jervis, N. Y. He was again promoted in February, 1904, to general foreman at Newburgh, N. Y., and in March, 1905, was transferred as general foreman to Bergen, N. J. Four years later he was again transferred as general foreman to Cleveland, Ohio, and since April 1, 1911, he was general foreman at Hornell, N. Y.

J. A. Boyden.

William Schlafge, who has been appointed general mechanical superintendent of the Erie Railroad, with office at New York, as has been announced in these columns, was born in Berlin, Germany, on October 11, 1868, and after receiving a common school education he attended night school. Mr. Schlafge began railway work in the machine and car shops of the Lehigh Valley at Packerton, Pa., and left that company in 1887, to go to the Minneapolis, St. Paul & Sault Ste. Marie shops at Minneapolis as an apprentice. After completing his apprenticeship he was engaged in various railway and contract shops as mechanic and foreman, and returned to the service of the Soo Line in 1893 as roundhouse foreman at Gladstone, Mich. He remained in this position until 1898, when he went to the Escanaba & Lake Superior as locomotive fireman and was then engineman and later was appointed master mechanic. His next position was roundhouse foreman at Newark, Ohio, with the Baltimore & Ohio, and three years later he was promoted to general foreman in charge of the loco-

W. Schlafge.

motive and car departments, with office at Chicago Junction, Ohio, remaining in that position until 1903. Mr. Schlafge went to the Erie in March, 1903, as general foreman at Port Jervis, N. Y., and the following year was made master mechanic at Jersey City, N. J. In December, 1906, he was made master car builder, with office at Meadville, Pa., and then within the next few months was general master mechanic and assistant mechanical superintendent of the same road. In October, 1907, he was promoted to mechanical superintendent of the Erie grand division and the New York, Susquehanna & Western, with office at Jersey City, which position he held at the time of his recent appointment as general mechanical superintendent of the Erie system.

W. T. Leyden, road foreman of equipment of the Minneapolis & St. Louis at Watertown, S. D., has been appointed acting master mechanic of the Eastern division, with office at Marshalltown, Ia., succeeding William Gill, granted leave of absence. William Gemlo has been appointed acting road foreman of equipment in charge of the Western division and the fourth district of the Central division, with office at Watertown, succeeding Mr. Leyden.

Purchasing Officers.

A. C. Mann, chief clerk in the purchasing department of the Illinois Central at Chicago, has been appointed assistant purchasing agent, with headquarters at Chicago, succeeding John C. Kuhns, promoted to purchasing agent.

John C. Kuhns, assistant purchasing agent of the Illinois Central at Chicago, has been appointed purchasing agent, with office at Chicago, succeeding C. F. Parker, elected vice-president. Mr. Kuhns was born at Waterloo, Iowa, August 18, 1871, and received his education in the public schools at Waterloo. He began railway work in 1887 as machinist apprentice at the Waterloo shops of the Illinois Central. Two years later he left the railway service to enter the insurance business, and in 1891 returned to the Illinois Central as clerk in the office of the supervisor of bridges and buildings at Waterloo. In 1894 he was transferred to Chicago in the bridge and building department, and on June 1, 1901, entered the purchasing department as assistant chief clerk. He was later promoted to chief clerk, and on May 23, 1907, was appointed assistant purchasing agent.

J. C. Kuhns.

OBITUARY.

E. B. Hooser, division freight agent of the Rock Island Lines, with office at Wichita, Kan., died at that place on January 16.

E. N. Hicks, formerly traveling passenger agent of the Lake Erie & Western, with office at Indianapolis, Ind., died at that place on January 15.

Joseph A. Brown, formerly for 28 years freight agent for the Cunard Steamship Company at New York, died from heart disease on January 21, in Brooklyn, N. Y.

William D. Bishop, Jr., formerly for many years secretary of the New York, New Haven & Hartford, died on January 23 at his home at Sea Cliff, N. Y., at the age of 53. Mr. Bishop was born at Bridgeport, Conn., and was a son of William D. Bishop, former president of the New York, New Haven & Hartford Railroad.

Bernard N. Farren of Massachusetts, formerly a well known railway contractor, died in Philadelphia, Pa., January 21, at an advanced age. Mr. Farren was one of the principal figures in the construction of the five-mile Hoosac Tunnel and the Troy & Greenfield Railroad, which together constitute that section of the Boston & Maine's line to the Hudson river, which was built by the state of Massachusetts. He was also engaged in numerous other important enterprises, including the construction of Turner's Falls, now an important manufacturing center.

D. B. McCoy, formerly and for 15 years superintendent of the Hudson division of the New York Central & Hudson River, with office at New York City, died on January 20, at the home of his son at Bogota, N. J., at the age of 67. Mr. McCoy began railway work when he was 15 years old as a telegraph operator on the Pittsburgh division of the Pennsylvania. He subsequently became train despatcher, and then division superintendent on the Pittsburgh, Fort Wayne & Chicago, the Pennsylvania's line to Chicago. In 1881 he went to the Chicago & North Western as superintendent of the Milwaukee and Wisconsin divisions. Three years later he returned East and was made superintendent of the Buffalo division of the West Shore, and in 1890 was promoted to be superintendent of the Hudson and Putnam divisions of the New York Central. He remained in this office until September 26, 1906, when he was appointed assistant to the general manager of the New York Central, from which position he was retired on a pension in December, 1908.

Elias A. Ford, formerly and for over 25 years at the head of the passenger department of the Pennsylvania Lines west of Pittsburgh, died on January 20, at his home in Pasadena, Cal., of heart disease. Mr. Ford was born on April 15, 1840, at Burton, Geauga county, Ohio, and began railway work in 1863. Previous to 1865 he was clerk at the union ticket office at Cleveland. He then became general western passenger agent of the Cleveland, Columbus & Cincinnati, and from 1868 to 1869 was general passenger agent of the Bellefontain Railroad, a part of the same system. From 1869 to 1871 he was general passenger agent of the consolidated system, the Cleveland, Columbus, Cincinnati & Indianapolis. Then for about four years he was general passenger agent of the Missouri Pacific and the Atlantic & Pacific Railways. In 1876 he was appointed general passenger agent of the St. Louis, Iron Mountain & Southern. From 1879 until his retirement in 1910 he was with the Pennsylvania System, beginning as general passenger of the Vandalia Line. From 1881 to May, 1904, he was also general passenger agent of all the Pennsylvania Lines West of Pittsburgh, including the Vandalia. In the latter year he was promoted to passenger traffic manager. Mr. Ford went to Pasadena about three years ago.

Charles F. Cox, treasurer of the Lake Shore & Michigan Southern, the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis, and other New York Central lines west of Buffalo, died at his home in Yonkers, N. Y., on Wednesday last, after a short illness of pneumonia. Mr. Cox was born on Staten Island (New York City), January 16, 1846, and had been in the service of the Vanderbilt lines for over 40 years. He was educated at the College of the City of New York and at Oberlin College, Ohio, being graduated from the latter class of 1869. His uncle was president of that college. Immediately after graduating, he entered the service of the Canada Southern as an accountant, and was successively assistant treasurer, secretary, vice-president and president of the road. He has been at the head of the treasury department, as above noted, for several years. Mr. Cox was prominent not only as a financier, but as a scientist, and was one of the chief promoters of the Young Men's Christian Association on the New York Central Lines. For two years he was president of the New York Academy of Sciences; and was a member of numerous other scientific organizations, both in this country and in Europe. He was a member of the Madison Square Presbyterian Church, New York City, and of the railway committee of the International Committee of Young Men's Christian Associations. He was prominent in numerous charitable organizations in New York City, and was vice-president of the Transportation Club. He leaves a wife and one daughter, Mrs. E. B. Jenks.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Delaware, Lackawanna & Western is figuring on 40 locomotives.

The Delaware & Hudson has ordered 12 consolidation locomotives from the American Locomotive Company.

The Canadian Pacific has ordered 25 ten-wheel locomotives and 8 freight locomotives from the American Locomotive Company and will build 50 ten-wheel locomotives and 25 switching locomotives at the company's shops.

CAR BUILDING.

The Bingham & Garfield is said to be in the market for 50 sixty-ton gondola cars. This item has not been confirmed.

The Cananea Consolidated Copper Co., Cananea, Mex., has ordered 12 Ingoldsby dump cars from the Pullman Company.

The Pennsylvania Railroad will build 400 freight cars at its Altoona shops. This company is now in the market for 150 passenger cars.

The Chicago, Milwaukee & St. Paul is said to be in the market for from 500 to 1,000 box cars and 500 refrigerator cars. This item has not been confirmed.

The Bessemer & Lake Erie, mentioned in the *Railway Age Gazette* of January 19 as being in the market for 2,000 gondola cars, is now in the market for 1,500 50-ton all steel gondola cars; 500 50-ton steel underframe box cars; 500 50-ton all steel box cars.

The Pennsylvania Lines West, instead of having ordered 1,400 freight cars from the Standard Steel Car Company, as mentioned in the *Railway Age Gazette* of January 19, have ordered 1,000 box cars from the Western Steel Car & Foundry Company; 800 coke cars from the Cambria Steel Company; 200 coke and 400 gondola cars from the Standard Steel Car Company; 600 gondola cars from the American Car & Foundry Company. This company is now in the market for 53 passenger cars.

The Rock Island Lines, as mentioned in the *Railway Age Gazette* of December 29, have ordered 2,500 steel underframe box cars from the Pullman Company. These cars are for July and August delivery, and will have a capacity of 80,000 lbs. The inside measurements will be 40 ft. long and 8 ft. 6 in. wide. The over-all measurements will be 40 ft. 3½ in. long, 8 ft. 7⅝ in. wide and 13 ft. ⅞ in. high. The special equipment will be as follows:

Bolsters—Buckeye.
Brakes—Westinghouse.
Brake beams—Chicago Railway Equipment Co.
Brasses—Chicago Bearing Metal Co.
Couplers—Major.
Door fastenings—Climax.
Draft gear—Farlow.
Journal boxes—Bettendorf.
Paint—Railway's standard.
Roofs—Murphy.
Springs—Railway Steel Springs Co.
Trucks—Bettendorf.
Wheels—Cast iron.

IRON AND STEEL.

The Chicago Junction has ordered 2,500 tons of rails from the Illinois Steel Company.

The Canadian Pacific has ordered 3,500 tons of structural steel from the Carnegie Steel Company.

The Baltimore & Ohio has ordered 1,500 tons of structural steel from the Pennsylvania Steel Company.

The Chicago Great Western has ordered 263 tons of steel for viaducts at Omaha, Neb., from the Vierling Steel Company.

The Delaware, Lackawanna & Western is said to have ordered 20,000 tons of rails from the Lackawanna Steel Company. This item has not been confirmed.

The Erie has ordered 13,890 tons of 90-lb. rails and 4,730 tons of 80-lb. rails from the Carnegie Steel Company; 8,000 tons of 90-lb. rails from the Lackawanna Steel Company, and 3,050 tons of 80-lb. rails from the Illinois Steel Company.

The New York Central Lines, as mentioned in the *Railway Age Gazette* of January 19, has ordered about 110,000 tons of rails. This order was divided as follows: United States Steel Corporation, 47,000 tons; Lackawanna Steel Company, 47,000 tons; Bethlehem Steel Company, the balance.

General Conditions in Steel.—The Steel Corporation continues to operate at about 89 per cent. of its capacity. During the past week there has been a temporary lull in new business received, but the orders on the books are so heavy that mill operations at almost capacity are assured for several months. For the first time in four years premiums are being offered for prompt deliveries. Rail orders have not been as heavy as were anticipated and are somewhat less than in 1911. Some large orders are pending, however, and it is expected that they will be placed shortly.

SIGNALING.

The Delaware, Lackawanna & Western has completed plans to install automatic block signals on 56 miles of single track between West Nanticoke, Pa., and Rupert, Pa.; and between Sherburne and Waterville, N. Y. The signals will be lower quadrant, two-position. Lower quadrant signals to govern movements on the eastward and westward freight tracks between Stroudsburg and Henryville, Pa., 10.5 miles, will also be installed during this year, each post to have a home and distant arm. An electric interlocking plant of 41 levers will be installed at Montclair, N. J.; a 16-lever mechanical plant at the entrance to the passing siding at Henryville, Pa., and an electric machine of six levers at the entrances to Oxford Tunnel, N. J.

Automatic Signals on Canadian Pacific.

The Canadian Pacific has ordered from the Hall Signal Company automatic block signals sufficient to equip 192 miles of its lines, including about 33 miles of double-track. Style "K" top post signals, with the arms working in the upper quadrant and three positions, will be used, and the work of installation will be begun in the spring after the frost is out of the ground. On the Canadian Pacific the night signal colors are green for proceed, yellow for caution and red for stop. The signals will be arranged to stand "normal danger," and the apparatus and construction will conform to the specifications of the Railway Signal Association. This will be the first extensive installation of automatic signals in the Dominion of Canada. The termini of the section, to be signaled are indicated below:

St. John to Vanceboro, 90.25 miles single track.
Romford Junction to Sudbury, 3.2 miles single track and 3.8 miles double track.
West Toronto to Bolton, 21.6 miles single track.
Place Viger to St. Therese, 20 miles double track.
Montreal Junction to Brigham Junction, 34.5 miles single track and 9.5 miles double track.
Islington to Streetsville, 12.9 miles single track.

FOREIGN RAILWAY NOTES.

A Russian commission has reported on the practicability of a tunnel through the Caucasus from Vladi Kaukaz north of the mountain range into the trans-Caucasian territory. It would be physically practicable to build such a tunnel, but it would be 13½ miles long—a mile longer than the Simplon tunnel in Switzerland, and it would have comparatively little traffic. There is already rail connection by a line which goes entirely around the Caucasus range at its eastern end. The territory has also good connection with western Russia by steamers on the Black sea.

Freight rates on the Hungarian State Railways are to be increased March 1. The advance is 7 per cent. for the ordinary rates and 5 per cent. for a group of articles which have been carried at less than the ordinary rates, presumably because they would not move at full rates. Various interests have urged that the advance should not apply to their particular freights, but the minister of railways said that the net earnings must be increased. If exports should actually be reduced by the higher charges, each case may be attended to hereafter as necessity arises.

Supply Trade News.

Charles R. Crane, the oldest son of the late R. T. Crane, has been made president of the Crane Company, Chicago, at the annual meeting, held on January 22.

The Automatic Signal & Appliance Company has been incorporated in Ohio with a capital stock of $10,000. James B. Hoge, of Cleveland, Ohio, is president, and N. G. Coen, also of Cleveland, is secretary.

The following officers of the Watson-Stillman Company, New York, have been elected: Vice-president, E. A. Stillman; treasurer, J. P. Bird; secretary and works manager, A. F. Stillman; chief engineer, Carl Wigtel.

The Firth-Sterling Steel Company, McKeesport, Pa., has opened a new branch office at Sixteenth and Connecticut streets, San Francisco, Cal. This office is in charge of E. O. Reynolds as manager, assisted by H. S. Norman and Alfred Olsen.

W. H. Lawrence has been made manager of the waterproofing and mastic department of the H. W. Johns-Manville Company, New York, with office in Chicago. Mr. Lawrence will have supervision of all the waterproofing work of the company throughout the country.

C. A. Delaney, for a number of years superintendent of the Dickson works of the American Locomotive Company, New York, with office at Scranton, Pa., and later sales representative at that place, has been made western representative of that company with office in Chicago.

The Smith Locomotive Adjustable Hub Plate Company, Pittsburg, Kan., is equipping a number of new locomotives for the St. Louis & San Francisco and the Missouri Pacific with its adjustable hub plates at the Schenectady, N. Y., plant of the American Locomotive Company, New York.

The Independent Pneumatic Tool Company, Chicago, has recently placed on the market a new One Man drill, which is equipped with compound planetary gears, and is particularly adapted for drilling, tapping and screwing in staybolts and studs of all sizes up to 1¼ in. This drill is of the reversible type, weighs 20 lbs. equipped with No. 3 Morse taper socket, and has Corliss valves.

The stockholders of the Dominion Iron & Steel Company, Sydney, N. S., have approved the proposal of the directors to issue $7,000,000 of the 6 per cent. preferred stock to be exchanged for the 6 per cent. income bonds of the subsidiary company. Of the preferred stock, $17,500,000 is authorized, and it is intended later to offer the unissued balance to holders of shares of the Dominion Iron & Steel Company, and of the Dominion Coal Company, Montreal, Que., at a price to return the present dividend rate. The plant of the Dominion Iron & Steel Company has been improved, so that the capacity is now 450,000 tons annually as compared with 250,000 tons in 1909.

William Wilkes Young, purchasing agent of the Union Switch & Signal Company, Swissvale, Pa., died at his home in Wilkinsburg on January 21 of cancer in the stomach. Mr. Young was born in Manchester, N. H., December 16, 1857. He came to the Union company in 1889, and served as district agent, as general agent, and for about six years as purchasing agent. He had a hard boyhood and was without technical education, except such as he picked up as he went along. He acquired a good fundamental knowledge of signaling and interlocking, and an excellent detail knowledge of mechanical and electro-pneumatic work, and of the simpler forms of direct current work. He had great capacity for organization and administration, which made him particularly useful on construction and installation. The last important work of that nature which he did for the Union company was the interlocking at the St. Louis, Mo., terminal. Mr. Young had entire field charge of that work, and he handled it with singular tact, skill and economy.

In the application by the American Brake Company, (which was taken over by the Westinghouse Air Brake Company, Pittsburgh, Pa., in 1898) for a preliminary injunction against the New York Air Brake Company, New York, in the district court of the United States, Southern district of New York, the court has granted an injunction against the infringement of claims 1, 2 and 5 of McKee patent 533,485, and claims 1, 2 and 3 of Lencke patent 568,777, and has refused to grant the injunction on the Wahlert patent 696,521. The court, in its memorandum granting the injunctions, says that "it will usually be better, in the ordinary administration of justice, to refuse preliminary injunctions in the first instance on untested patents even comparatively new, and leave matters to the tribunal which can speak with practical finality." These considerations, the court says, would have led to a denial of the present motion "were it not for the very recent and determined infringement complained of, and the imminent expiration of the principal patent; a determination so imminent that if complainant cannot get an injunction now, it never can get one. This peculiarity of the case leads to an expression of opinion positive, though not, perhaps, as full as it would be at final hearing." The complainant manufactures automatic brake adjusters under the patents brought up in this suit and under two other patents, the last one of which expired January 10, 1910. This last patent formed a basis of the complainant's business in brake adjusters, and in it there was undoubtedly public acquiescence of the strongest kind. The McKee and Lencke patents involved in this suit purport to be no more than improvements on the expired patents. The Wahlert patent is for the combination of a brake adjuster of a closed casting with certain parts of a brake adjuster. The Wahlert patent still has upwards of seven years to run, and the court holds that it should be left to be finally passed on without the granting of a preliminary injunction; but "it is also in my [the court's] judgment fairly shown by a preponderance of expert evidence that it displays no patentable invention, and that at best it is no more than an aggregation of previously known and long used parts in a form convenient, to be sure, but displaying nothing more than mechanical skill." The expired McKee patent was admittedly the fundamental patent for the type of slack adjuster here in controversy. Its characteristic most important in this case was that the fulcrum block, which was moved by the action of the piston of the take-up motor, was attached to the fulcrum of the dead lever. "The expired McKee patent covered the necessary application of this take-up device to any (practicable) one of the brake rigging levers. What the public has acquiesced in for more than 17 years is not so much any patent now in suit as the McKee patents of 1892 and 1893; nevertheless, the expiration of these last mentioned patents did not produce any competitor for a year and a half after the earlier McKee patents ran out." Then the defendant put on the market a device which, for all practical purposes, "is what our senior judge has so often called a Chinese imitation of the complainant's apparatus. If imitation be the sincerest flattery, it is impossible to conceive any more fulsome tribute to the McKee devices (one and all) than defendant's machine and apparatus, and every equitable consideration is in favor of complainant unless it can be clearly shown that defendant has taken nothing to which complainant is still entitled. It is, I think, proved (as defendant states) that slack may be taken up at one point or another at the option of the instructor, and in divers machines it has been taken up in divers places, but where one particular method of taking up makes an original apparatus so compact, durable and desirable as does the McKee patent of 1893, I think invention is thereby shown." The same method of criticism is applicable to the Lencke patent as to the McKee patent. It is narrow; it is for a very particular apparatus or a very special style of apparatus, "but it is not fair to assert at this late date that what so ingenious an inventor as McKee did not find obvious in 1893, was too plain to permit invention to be ascribed to the solution thereof in 1896."

TRADE PUBLICATIONS.

DIGGING MACHINERY.—The Hayward Company, New York, has issued an attractive folder illustrating various uses of its buckets and digging machinery in different kinds of excavation and dredging work.

BORING AND TURNING MILLS.—The Betts Machine Company, Wilmington, Del., has published a 100-page well illustrated catalog of its heavy machine tools for high speed steel. These machine tools are especially adapted for railway, locomotive and car shops. Each machine is illustrated by full page illustrations and is clearly and concisely described.

Railway Construction.

New Incorporations, Surveys, Etc.

Arizona Eastern.—See Southern Pacific.

Atchison, Topeka & Santa Fe.—According to press reports the Dodge City & Cimaron Valley has given a grading contract to Ransom & Cook, Ottawa, Kan., for work from Dodge City, Kan., southwest to Santa Fe Junction, in Haskell county. E. L. Copeland, secretary and treasurer, Topeka. (December 9, 1911, p. 1188.)

Beaverton & Willsburg.—See Southern Pacific.

Canadian Northern.—This company is negotiating with the city of Montreal with reference to the proposed terminals in that city. The plans call for the following work: A double track tunnel 3.3 miles long and 40 to 700 ft. deep, from a point half a mile west of the Canadian Pacific's Outremont yards to Lagauchetiere street; an underground station on Dorchester street; elevated tracks from the tunnel mouth to the present Brennan street tracks; elevated freight sheds, and river front connection with the Moreau street station; also a spur line there to the Dorchester street tunnel. (January 5, p. 37.)

Canadian Pacific.—An officer is quoted as saying that the company will spend a large amount of money during the coming year extending the system in the western provinces. The plans include a large amount of double tracking work, construction of branch lines and the extension of terminal facilities at various places. It is understood that the main line will be double tracked on all congested sections. Plans have been approved for double tracking between Regina, Sask., and Chaplin, between Hammond, B. C., and Vancouver, also between Alyth, Alta, and Sunalta. Important extensions are to be made to the terminal facilities at Vancouver, Calgary, Swift Current, Moose Jaw, Regina, Broadview, Brandon and Fort William. A new terminal is to be built at Coquitlam, B. C. To improve the terminal facilities at Winnipeg, Man., two alternative surveys are now being made, one of them includes a cutoff from Reaburn. The extension work includes about 100 miles from Viceroy, Sask., to the Weyburn line; 85 miles is to be added to the line northwest of Swift Current, and construction work will be started on the main line west of Medicine Hat in a southwesterly direction. About 470 miles of line will be laid with 80-lb. rail to replace lighter sections. J. G. Sullivan, chief engineer, Winnipeg, Man.

Catskill Traction Company.—The New York Public Service Commission, Second district, has granted this company permission to build from Leeds, N. Y., to Cairo, about 7 miles. H. C. Cowen, president, Catskill.

Central California.—See Southern Pacific.

Central Pacific.—See Southern Pacific.

Chicago & Eastern Illinois.—Financial arrangements are being made to build a connecting line between the Chicago & Eastern Illinois and the New Orleans, Mobile & Chicago, under the plans for the extension of the latter company to form a new short route between Chicago and Mobile, Ala., and New Orleans, La. L. C. Hartley, engineer maintenance of way, Chicago, Ill.

Elkin & Allegheny.—An officer writes that this company plans to build from Elkin, N. C., northwest to Sparta about 25 miles through a mountainous country. Track has been laid on 12 miles. H. G. Chatham, president, Elkin.

Georgia & Alabama.—Incorporated in Alabama to build a 50 mile line from Tallapoosa, Ga., southwest through Haralson county, Ga., and Cleburne and Randolph counties, Ala., to a connection with the Atlanta, Birmingham & Atlantic, near Malone, about 50 miles. The names of the incorporators are not given.

Louisville & Nashville.—According to press reports a contract has recently been let for double tracking work between Black Creek, Ala., and Nashville, Tenn. J. B. Smith & Company, Knoxville, has a contract for 19 miles of concrete and steel work south of Nashville, and another contract has been given to the McDowell Company. Additional contracts are expected to be let in the near future. W. H. Courtenay, chief engineer, Louisville, Ky.

Louisiana Western.—See Southern Pacific.

Mexican Pacific.—An officer is quoted as saying that this line will be built from Acapulco, Mex., to Sihuatanejo, another port on the west coast, thence to Balsas, where a connection is to be made with the National Railways of Mexico, about 530 miles. Work was started some two years ago, at which time the company only had a concession between Acapulco and Sihuatanejo, but this has since been extended. The line will traverse a rich mining section. Construction work is to be pushed from three points, and in addition the company plans to build a branch about 100 miles long to connect with the Rothschild mines. Joseph Castellot, vice-president; Henry Weiss, general manager, both of Mexico City.

Midland Continental.—According to press reports this company has secured funds for completing the line from Jamestown, N. D., northeast to Winnipeg, Man., and construction work is to be started in April. The first 50 miles from Jamestown north has been built. F. K. Bull, president, Racine, Wis.

Milwaukee, Peoria & St. Louis.—According to press reports this company will begin work at once on the section from Peoria, Ill., north along the east bank of the Illinois river to a crossing of the Atchison, Topeka & Santa Fe, near Chillicothe. The line is to be extended north to Rockford, about 120 miles from Peoria. F. W. Cherry, Princeton, is back of the project, and B. Schreiner is chief engineer. (November 17, p. 1036.)

Minnesota, Dakota & Western.—According to press reports, work may be started this year on an extension to complete a connection between International Falls and Thief River Falls. The proposed route is from Loman, Minn., west through Koochiching, Beltrami, Marshall and Pennington counties. The company now operates a 23-mile line from International Falls west to Loman, and is said to have made preliminary surveys for the extension. F. Shiefield, chief engineer, International Falls.

Montreal Transcontinental.—Application will be made in Canada for incorporation to build from Montreal, Que., northerly and northwesterly through the counties of Hochelaga, Laval, Terreboone, Argenteuil, Montcalm, Labelle, Wright and Pontiac, to connect with the Grand Trunk Pacific near Grand Victoria lake. The names of the promoters are not given.

Montrose-Paradox Railroad Construction Company.—This company is said to be planning to build a line between Montrose, Colo., and the Paradox valley, about 100 miles. S. S. Sherman, G. O. Gilbert and J. F. Kyle, Montrose, S. E. Blakeslee and K. B. Hequenbourg, Paradox, are incorporators.

Morgan's Louisiana & Texas.—See Southern Pacific.

Nevada & California.—See Southern Pacific.

New Orleans, Mobile & Chicago.—See Chicago & Eastern Illinois.

New York Subways.—Bids have been opened for the construction of section 2 of the Broadway-Lexington avenue subway from a point 75 ft. south of the center line of Park Place to a point 90 feet north of the center line of Walker street, in the borough of Manhattan. The length of the section will be 2,800 ft. There is to be a station at City Hall.

Norfolk & Western.—According to press reports this company will start double-tracking work soon on about 15 miles between Gilmerton, Va., and Suffolk, and on the completion of this work, the line between Petersburg and Concord will also be double tracked. It is understood that the company is planning to carry out some improvements at the yard at Lamberts Point.

Oregon & California.—See Southern Pacific.

Oregon Eastern.—See Southern Pacific.

Oregon-Washington Railroad & Navigation Company.—An officer is quoted as saying that it is the intention of the Harriman Lines to build a direct line from Seattle, Wash., north to Vancouver, B. C., 180 miles. The line is eventually to be extended to other points in British Columbia. J. D. Isaacs, consulting engineer, Chicago, Ill.

OREGON WESTERN.—See Southern Pacific.

PACIFIC RAILWAY & NAVIGATION CO.—See Southern Pacific.

SACRAMENTO SOUTHERN.—See Southern Pacific.

SOUTHERN PACIFIC.—The report of this company for the year ended June 30, 1911, shows that the following lines are now open for operation:

Beaverton & Willsburg.—Beaverton, Ore., to Willsburg Junction, 10½ miles.

Central California.—Newark, Cal., to Redwood, 11 miles.

Central Pacific.—Built about 5 miles.

Louisiana Western.—Eunice, La., to Mamou, 9½ miles.

Morgan's Louisiana & Texas.—Lafayette, La., to Baton Rouge Junction, 51 miles.

Nevada & California.—Olancha, Cal., to Owenyo, 30 miles.

Oregon & California.—Crabtree, Ore., to Lebanon, 8 miles.

Southern Pacific of Mexico.—Under the concessions granted for the construction of the railway lines in Mexico, there was completed during the year 12½ miles, making a total of 912 miles completed to June 30. On the main line projected from Empalme, Mexico, to Guadalajara 839 miles, there has been finished a total of 683 miles. Work is now under way on 32 miles, and there remains 124 miles yet to be built. The branch lines projected total 652 miles, of which 230 miles are finished, and 422 miles remain to be built. Under the concessions as revised, the company has until November, 1915, to complete the line to Guadalajara, and until November, 1920, to complete the branch lines.

Work is nearing completion on the electrification of the suburban lines connecting with the ferries from San Francisco, Cal., to Oakland Mole and Alameda Mole, and extending into the cities and districts of Oakland, Alameda and Berkeley, and into other San Francisco bay districts.

Work is now under way on the following lines:

Arizona Eastern.—Phoenix, Ariz., to Hassayampa, 39 miles, on which track laying has been finished; Winkelman to San Carlos, 33 miles, track has been laid on 7 miles; Hayden Junction to Winkelman, 4 miles, track has been laid on 1½ miles, and grading is completed on one mile additional.

Oregon Eastern.—Klamath Falls, Ore., north, 86 miles, track has been laid on 28 miles, and grading is under way on 8 miles; Natron south, 105 miles, track has been laid on 24 miles, and grading is completed on 8 miles, and is under way on 2 miles additional.

Oregon Western.—Drain, Ore., to Marshfield, 73 miles.

Pacific Railway & Navigation Company.—Hillsboro, Ore., to Tillamook, 91 miles, track has been laid on 78 miles, and grading is finished on the other 13 miles.

Sacramento Southern.—Sacramento, Cal., to Walnut Grove, 24 miles, track has been laid on 10 miles, and grading is finished on 13 miles additional.

SOUTHERN PACIFIC OF MEXICO.—See Southern Pacific.

STUTTGART & RICE VALLEY.—An officer writes that this company, which now operates a line from Mesa City, Ark., south to Stuttgart, 22½ miles, has projected an extension from Stuttgart south to Coopers Ferry, 20 miles. J. H. Davisson, general manager, Stuttgart.

WICHITA FALLS ROUTE.—The Wichita Falls & Northwestern has amended its charter in Oklahoma, providing for an extension of the main line in Custer, Dewey, Woodward, Harper, Ellis and Beaver counties to the town of Forgan. M. M. Cooke, chief engineer, Wichita Falls. (December 22, p. 1301.)

WICHITA FALLS & NORTHWESTERN.—See Wichita Falls Route.

WICHITA, KINSLEY, SCOTT CITY & DENVER AIR LINE.—This company, which was organized in Kansas in 1909, has been given permission to make a mortgage to secure funds for building from Wichita, Kan., to Burlington, Colo. W. F. Burn, president of Pratt county, Kan., president, and H. P. Ketcham, secretary.

YOUNGSTOWN & SOUTHERN (Electric).—According to press reports, this company will build an extension from Columbiana, Ohio, east via New Waterford, to East Palestine. Rights of way have been secured. E. H. Raupp, general manager, Youngstown.

RAILWAY STRUCTURES.

ARGENTA, ARK.—The St. Louis, Iron Mountain & Southern will build a 30-stall roundhouse at this place.

ARGO, WASH.—The Oregon-Washington Railroad & Navigation Company has given a contract to Grant, Smith & Company, Seattle, for the erection of a machine shop 90 ft. x 180 ft., a power house 40 ft. x 90 ft., and a storehouse 36 ft. x 36 ft., all of reinforced concrete construction.

BALTIMORE, MD.—According to press reports, the Western Maryland has plans made for putting up a large terminal at Baltimore.

BAY CITY, MICH.—The Grand Trunk is reported to have awarded a contract to the Milwaukee Bridge & Iron Company for 1,400 tons of steel for bridge over the Saginaw river.

CHICAGO.—The Central Terminal Railway, which is building a freight terminal in Chicago for the Minneapolis, St. Paul & Sault Ste. Marie, has acquired by condemnation 58 parcels of land, in addition to 105 parcels secured some time ago between West Twelfth and West Fifteenth streets, and between Canal and Jefferson streets.

COQUITLAM, B. C.—See Canadian Pacific under Railway Construction.

FORT STOCKTON, TEX.—It is reported that the Kansas City, Mexico & Orient will build a 20-stall roundhouse and shops at this point.

GASTON, ORE.—The Southern Pacific will build a new station, it is said, at Gaston.

JERSEY CITY, N. J.—The Pennsylvania Railroad has given a contract to the J. S. Rogers Company, Morristown, N. J., for building a passenger station at Summit and Sip avenues, Jersey City. It is understood that the improvements will cost about $76,000.

JOPLIN, MO.—The new office building to be erected by the St. Louis & San Francisco is to occupy an area of 100 ft. x 127 ft., will be eight stories in height, and will cost about $350,000. It will contain a passenger station, store room and offices, and is expected to be completed by January 1, 1913. Mauran, Russell & Crowell are the architects.

MARION, KAN.—The Atchison, Topeka & Santa Fe will build a new brick combination freight and passenger station, to cost $17,000.

MONTREAL, QUE.—See Canadian Northern under Railway Construction.

NATIONAL CITY, CAL.—The Atchison, Topeka & Santa Fe will build a roundhouse, at National City, and will also construct a 2,600 ft. concrete pier.

NOGALES, ARIZ.—The Southern Pacific will soon start work, it is said, on a freight station at Nogales.

PANAMA CITY, PANAMA.—Plans are being made by the Panama Railroad Company for building a new passenger station at Panama City. It is understood that the new building will be of reinforced concrete construction, two or three stories high, and will have concrete platforms and train sheds.

SCHENECTADY, N. Y.—An officer of the Delaware & Hudson writes that this company is putting up a new bridge over the Mohawk river near Schenectady, where the proposed barge canal is to use the channel of the Mohawk river. The bridge is to carry two tracks, and will replace the existing single track bridge.

SANTA ANA, CAL.—The Pacific Electric, it is said, will build a new concrete bridge to have two 60-ft. spans, at West Twelfth street.

SWEETWATER, TEX.—The Texas & Pacific proposes to begin soon the erection of a new freight depot.

TACOMA, WASH.—According to press reports the Oregon-Washington Railroad & Navigation Company will shortly let a contract for new shops.

WINLOCK, WASH.—The Northern Pacific is asking for bids for a new passenger station, to be built at Winlock, to replace the structure recently destroyed by fire.

Railway Financial News.

Baltimore & Ohio.—This company has sold to Speyer & Co., and Kuhn, Loeb & Co., both of New York, $10,000,000 ten year 4½ per cent. car trust certificates.

See also Cincinnati, Hamilton & Dayton.

Chicago & Eastern Illinois.—It is said that the appointment of Kuhn, Loeb & Co. as the bankers for the company is preparatory to the financing of a connection between the C. & E. I. and the New Orleans, Mobile & Chicago. See an item under Railway Construction.

Cincinnati, Hamilton & Dayton.—Kissel, Kinnicutt & Co., New York, are offering $2,000,000 of the authorized $20,000,000 C., H. & D. 4 per cent. bonds, guaranteed principal and interest by the Baltimore & Ohio, at 81½. The bonds were issued calling for fixed interest payments from 1911 to 1914 at 1 per cent. annually; from 1914 to 1916, 3 per cent. annually, and after that, 4½ per cent. In addition, the bonds have interest coupons calling for the payment of the full 4½ per cent. interest for the entire period they are outstanding, if such interest is earned; and the bonds at present offered have deposited with the Bankers' Trust Co., New York, as trustee, the full amount of cash to pay the difference between a fixed 4 per cent. dividend and the fixed rate called for by the bonds from now until 1916. The bonds may run to 1930, or may in 1916 be purchased by the B. & O. at 85 for 4 per cent. bonds, guaranteed principal and interest by the B. & O.

Colorado & Southern.—This company has brought suit against the trustees of its two bond issues to compel them to consent to the sale of the stock of the Colorado Midland, which is held as additional security for the two issues of the Colorado & Southern's own bonds. An offer of $150,000 has been made for the stock of the Colorado Midland, held by the Colorado & Southern, and the Colorado & Southern, in its suit, claims that if the Colorado Midland defaults on its bond interest and foreclosure proceedings are brought, the stock of the Midland owned by the C. & S. will be rendered almost valueless. Control of the Midland is held jointly by the C. & S. and the Denver & Rio Grande.

Colorado Midland.—See Colorado & Southern.

Denver & Rio Grande.—See Colorado & Southern.

Frankfort & Cincinnati.—See Louisville & Nashville.

Grand Trunk.—This company is to ask the Canadian parliament for permission to buy or sell first mortgage bonds of the Grand Trunk Western to an amount not to exceed $30,000,000, and for permission to guarantee bonds, debentures or debenture stock of any company, the control of which is held either by the Grand Trunk or the Grand Trunk Pacific.

See also Grand Trunk Pacific.

Grand Trunk Pacific.—This company is to ask the Canadian parliament for permission to issue £5,000,000 ($25,000,000) perpetual or terminal debenture stock.

[The Grand Trunk and Grand Trunk Pacific were closely allied with the Laurier government, which failed to retain office at the last general election.]

See also Grand Trunk.

Hampden Railroad.—F. S. Moseley & Co., Boston, Mass., have bought $1,000,000 of an issue of $1,400,000 one-year notes. The Hampden Railroad is a subsidiary of the New York, New Haven & Hartford, and when completed will be operated under lease by the Boston & Maine.

Louisville & Nashville.—The Kentucky Board of Appeals has overruled the petition, by the Louisville & Nashville, for a rehearing of the case in which the Court of Appeals originally decided that the L. & N. and the Frankfort & Cincinnati, which runs from Frankfort, Ky., to Paris, are parallel and competing lines, and that therefore the L. & N. cannot absorb the Frankfort & Cincinnati.

See Louisville, Henderson & St. Louis.

Louisville, Henderson & St. Louis.—A preferred stockholders' protective committee has been formed consisting of Otto Marx, Felix Rosen, Alfred Shepherd, E. F. Enslen, W. M. Bullitt, with H. Hoffman, secretary, 37 Wall street, New York. The Louisville & Nashville controls the Louisville, Henderson & St. Louis through the ownership of $1,631,385 of the $2,000,000 common stock and $771,081 of the $2,000,000 preferred stock.

New York Central & Hudson River.—In connection with the offer, mentioned last week, of the New York Central & Hudson River to buy at $175 per $50 share the stock of the New York & Harlem, the N. Y. & H. stockholders are offered as a separate proposition the right to subscribe at $92 for new 4 per cent. debentures which the New York Public Service Commission, Second district, has authorized, to an amount not to exceed $35,000,000.

New York, New Haven & Hartford.—See Hampden Railroad.

Ocilla Southern.—This company, with a road running from Fitzgerald, Ga., to Alapaha, has been granted permission by the secretary of state, Georgia, to increase its authorized capital stock from $150,000 to $1,000,000.

Virginian.—Stockholders are to vote on January 27 on the question of increasing the capital stock from $36,000,000 to $65,000,000. Of the total, $29,000,000 is to be 5 per cent. cumulative preferred and $36,000,000 common. The preferred stock is not to be entitled to receive more than 5 per cent., but is entitled to receive full payment in par in the case of dissolution before anything is paid on the common.

Wabash.—F. A. Delano, receiver, is making arrangements for the issue of receiver's certificates. The application to the court will probably be for about $5,000,000 to provide funds for equipment and increased track facilities.

The bond holders' protective committee, J. N. Wallace, chairman, have engaged J. W. Kendrick, formerly vice-president of the Atchison, Topeka & Santa Fe, to make an inspection, and report on the requirements of the Wabash.

FOREIGN RAILWAY NOTES.

According to a circular letter sent to shareholders, the board of directors of the United Railways of Havana, Cuba, have decided to acquire the ownership of the Eastern Railway. The transaction will be effected through an exchange of the shares of the one company for those of the other.

A very satisfactory report was read at the extraordinary general meeting of the Armavir-Tuapse Railway Company, Russia, held on December 28, where 17 shareholders, representing 25,205 shares, were present, including the Russo-Asiatic Bank, with 4,000 shares. It was shown that the operation of the Armavir-Bielorietchensk-Maikop section during the first eight months of 1911 gives hope of a larger net profit at the end of the year than was expected. The management considers its forecasts to be fully justified and anticipates equally satisfactory results in 1912. The construction of the following three branch lines were approved at the meeting: Armavir-Stavropol-Petrovsk-Blagodarnoye, Petrovsk-Divnoye and Kurgana-Babinski. The length of these branches will be about 226 miles, and the cost of their construction, $11,946,000.

The transportation and navigation committee of the Bolivian chamber of deputies has recommended that the Bolivian congress grant a concession to Simon I. Patiño for the construction of a railway from Cochabamba to a port on the Chimore river. This railway is to be operated by electric or steam traction, or both, at the opinion of the concessionaire. The recommended gage of the railway is 2 ft. 4 in., but if this gage should be found unsuitable after the railway route has been surveyed than a 3-ft. gage line may be constructed. The survey is to be made within 18 months from the date of the concession, and the work must be completed within six months after the opening of the Oruro to Cochabamba railway to public traffic. The main line may be extended, or branch lines constructed, but in such cases the previous consent of the government must be obtained. Recommendation is made that no parallel railways be allowed to be built within a zone extending 25 miles on either side of the right of way of the main line of the road. The construction material for building the railway is to be imported free of duty. At the end of 99 years the line and all its rolling stock are to revert to the government. The approximate cost of the railway is $3,000,000.

ANNUAL REPORT

TWENTY-SEVENTH ANNUAL REPORT OF THE SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES.

INCOME FOR THE YEAR.

The gross receipts and disbursements, after excluding all offsetting transactions between the Companies, were as follows:

	This Year.	Last Year.	+Increase. —Decrease.
Average miles of railway operated—proprietary and non-proprietary	9,895.07	9,752.26	+ 142.81
TRANSPORTATION OPERATIONS.			
Gross operating revenues	$121,911,028.10	$124,523,905.08	—$2,612,876.98
Outside operations—revenues	10.709,511.41	10,498,701.79	+ 210,809.62
Total	$132,620,539.51	$135,022,606.87	—$2,402,067.36
Operating expenses	$74,521,659.84	$73,514,034.42	+$1,007,625.42
Outside operations—expenses	10,483,554.02	9,750,813.57	+ 732,740.45
Taxes (rail lines and properties dealt with as outside operations)	4,850,347.57	4,519,374.01	+ 330,973.56
Total	$89,855,561.43	$87,784,222.00	+$2,071,339.43
Operating revenues over expenses and taxes	$42,764,978.08	$47,238,384.87	—$4,473,406.79
INCOME OTHER THAN FROM TRANSPORTATION OPERATIONS.			
Interest on bonds owned of Proprietary Companies (Table No. 4)	$1,051,971.39	$854,174.84	+ $197,796.55
Interest on bonds owned of companies other than Proprietary Companies (Table No. 4)	2,935,575.94	1,285,723.65	+ 1,649,852.29
Dividends on stocks owned of companies other than Proprietary Companies (Table No. 5)	781,796.08	1,349,573.28	— 567,777.20
Wells, Fargo & Co.'s Express extra dividend	—	4,590,000.00	— 4,590,000.00
Income from lands and securities not pledged for redemption of bonds	956,529.05	894,164.31	+ 62,364.74
Income from sinking funds pledged for the redemption of bonds	93,532.54	161,514.97	— 67,982.43
Balance of interest received on loans and of interest accruing to June 30, on open accounts other than with Proprietary Companies	728,454.03	1,508,878.56	— 780,424.53
Miscellaneous income	80,917.41	65,150.84	+ 15,766.57
Total	$6,628,776.44	$10,709,180.45	—$4,080,404.01
Surplus	$49,393,754.52	$57,947,565.32	—$8,553,810.80
FIXED CHARGES.			
Interest on outstanding funded debt of Southern Pacific Co. and Proprietary Companies (Table No. 6)	$20,897,152.53	$20,200,665.24	+ $696,487.29
Sinking fund contributions and income from sinking fund investments	374,712.54	378,514.97	— 3,802.43
Hire of equipment—balance	250,481.77	448,342.77	— 197,861.00
	$21,522,346.84	$21,027,522.98	+ $494,823.86
Less rentals for lease of road, for joint tracks, yards, and other facilities, viz.: Collections ..$810,675.29 Payments 704,262.86	106,412.43	320,885.20	— 214,472.77
Total fixed charges	$21,415,934.41	$20,706,637.78	+ $709,296.63
Surplus over fixed charges	$27,977,820.11	$37,240,927.54	—$9,263,107.43
OTHER CHARGES.			
Land department expenses	$225,689.21	$113,866.28	+ $111,822.93
Taxes on granted and other lands	319,517.29	278,085.58	+ 41,431.71
Miscellaneous expenses	34,121.52	29,260.10	+ 4,861.42
Taxes and other expenses of Southern Pacific Company	291,703.42	317,082.52	— 25,379.10
Additions and betterments payable from income of Southern Pacific Company	123,033.79	511,819.89	— 388,786.10
Reserve for depreciation of rolling stock owned by Southern Pacific Company and leased to other companies	866,547.65	527,594.94	+ 338,952.71
Total other charges	$1,860,612.88	$1,777,709.31	+ $82,903.57
Surplus over fixed and other charges	$26,117,207.23	$35,463,218.23*	—$9,346,011.00

*The normal income of the Company decreased $4,756,011. The receipt last year, however, of an extra dividend of $4,590,000 from Wells, Fargo & Co.'s Express augmented the normal decrease by that sum.

EQUIPMENT.

The changes in equipment during the year were as follows:

	Condemned, Destroyed, Sold or Transferred to Another Class, and Credited to Equipment. †		Added and Charged to Equipment. †		Added and Charged to Free Asset, S. P. Co.		Total. †	
	Number.	Original Cost.	Number.	Cost.	Number.	Cost.	Number.	Cost.
Locomotives	37	$376,224.49	166	$2,202,978.58	*78	*$931,501.22	88	$1,271,477.36
Baggage cars	11	.....	53	.....	*10	.....	43	.....
Baggage and mail cars	—	.....	4	.....	*2	.....	2	.....
Baggage and passenger cars	2	.....	—	.....	—	.....	—	.....
Baggage, mail and passenger cars	2	.....	—	.....	—	.....	—	.....
Business cars	—	.....	1	.....	—	.....	1	.....
Composite cars	1	.....	—	.....	—	.....	—	.....
Dining cars	—	.....	—	.....	12	.....	12	.....
Motor cars (gasoline)	—	.....	6	.....	5	.....	11	.....
Motor car trailers	1	.....	3	.....	*3	.....	—	.....
Motor cars (electric)	—	.....	—	.....	65	.....	65	.....
Other cars (electric)	—	.....	—	.....	50	.....	50	.....
Observation cars	—	.....	2	.....	10	.....	12	.....
Passenger cars	30	.....	46	.....	25	.....	71	.....
Postal cars	16	.....	10	.....	34	.....	44	.....
Total passenger-train cars	63	353,971.39	125	847,136.02	186	2,523,964.10	311	3,371,100.12
Box cars	796	.....	1,596	.....	876	.....	*2,472	.....
Box automobile cars	—	.....	—	.....	500	.....	500	.....
Caboose cars	12	.....	4	.....	21	.....	25	.....
Flat cars	895	.....	766	.....	*16	.....	750	.....
Fruit cars	9	.....	—	.....	—	.....	—	.....
Furniture cars	15	.....	—	.....	—	.....	—	.....
Gondola cars	72	.....	101	.....	450	.....	551	.....
Gondola (D. B.) cars	—	.....	—	.....	200	.....	200	.....
Gondola (H. B.) cars	68	.....	—	.....	—	.....	—	.....
Logging cars	—	.....	50	.....	—	.....	50	.....
Refrigerator cars	2	.....	—	.....	—	.....	—	.....
Stock cars	36	.....	320	.....	254	.....	574	.....
Tank cars	11	.....	157	.....	*150	.....	7	.....
Narrow gauge cars	9	.....	1	.....	—	.....	1	.....
Total freight-train cars	1,925	1,064,677.44	2,995	2,684,653.58	2,135	2,366,492.91	5,130	5,051,146.49
Work equipment	357	114,000.12	394	201,186.85	286	325,947.13	680	527,133.98
Total	—	$1,908,873.44	—	$5,935,955.03	—	$4,284,902.92	—	$10,220,857.95

NOTE:—Included in the above are 1 work car added, and 1 passenger and 7 freight cars vacated, the property of the California Northeastern Ry. Co., operated by the Central Pacific Ry. Co.

*Sold by Southern Pacific Company to Proprietary Companies. † Include 9 baggage, 17 passenger, 4 postal, 198 box, 4 caboose and 100 flat cars vacated and transferred between Proprietary Companies.

The original cost and salvage value of equipment retired during the year, and the amount charged to operating expenses in respect thereof, were as follows:

	Total.	Locomotives.	Passenger-Train Cars.	Freight-Train Cars.	Work Equipment.
Original cost (estimated if not known)	$1,908,873.44	$376,224.49	$353,971.39	$1,064,677.44	$114,000.12
Proceeds from sale or salvage value	935,780.99	96,457.44	264,522.33	524,031,63	50,769.59
Charged to operating expenses	$973,092.45	$279,767.05	$89,449.06	$540,645.81	$63,230.53

The locomotives added during the year averaged 116.77 tons total weight of engine, without tender, and 90.15 tons upon drivers, and freight-train cars 48.74 tons capacity.

The number of locomotives and cars of standard gauge owned, and the total and average capacity of freight-train cars at the close of the year were as follows:

Standard Gauge.	This Year.	Last Year.	Increase.	Per Cent.
Locomotives	1,858	1,808	50	2.77
Total weight, excluding tender (tons)	142,493	134,790	7,703	5.71
Average weight, excluding tender (tons)	76.12	74.02	2.10	2.84
Total weight on drivers (tons)	117,491	111,097	6,394	5.76
Average weight on drivers (tons)	62.76	61.01	1.75	2.87
Passenger-train cars	2,190	1,942	248	12.77
Freight-train cars	48,192	44,979	3,213	7.14
Total capacity (tons)	1,917,650	1,728,039	189,611	10.97
Average capacity (tons)	40.41	39.05	1.36	3.48
Work equipment	6,636	6,318	318	5.03

TRANSPORTATION OPERATIONS.

The results of the year's transportation operations compared with those of the preceding year are as follows:

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Average miles of railway operated	9,895.07	9,752.26	142.81	1.46
Revenues.				
Freight	$73,677,292.78	$77,018,554.26	—$3,341,261.48	4.34
Passenger, including extra baggage	40,814,399.52	40,244,855.79	569,543.73	1.42
Mail and express	5,165,948.87	4,976,272.55	189,676.32	3.81
Switching, rentals, and all other sources	2,253,386.93	2,284,222.48	—30,835.55	1.35
Total rail lines	$121,911,028.10	$124,523,905.08	—$2,612,876.98	2.10
Outside operations—revenues	10,709,511.41	10,498,701.79	210,809.62	2.01
Total revenues	$132,620,539.51	$135,022,606.87	—$2,402,067.36	1.78
Operating Expenses.				
Maintenance of way and structures	$15,889,129.83	$16,098,705.22	—$209,575.39	1.30
Maintenance of equipment	15,312,205.79	15,808,390.67	496,184.88	3.14
Traffic expenses	2,947,063.58	2,481,186.30	465,877.28	18.78
Transportation expenses	36,524,585.10	35,658,045.72	866,539.38	2.43
General expenses	3,848,675.54	3,467,706.51	380,969.03	10.99
Total rail lines	$74,521,659.84	$73,514,034.42	$1,007,625.42	1.37
Outside operations—expenses	10,483,554.02	9,750,813.57	732,740.45	7.51
Total expenses	$85,005,213.86	$83,264,847.99	$1,740,365.87	2.09
Gross revenues over total expenses	$47,615,325.65	$51,757,758.88	—$4,142,433.23	8.00
Freight Traffic.				
(Commercial Freight Only —Way-bill Tonnage).				
Tons of freight carried	26,706,631	25,962,704	743,927	2.87
Tons of freight carried one mile	6,189,785,390	6,628,685,724	—438,900,334	6.62
Ton miles per mile of road (a)	632,245	678,797	—46,552	6.86
Revenue from freight per mile of road. (a)	$7,269.16	$7,772.58	—$503.42	6.48
Revenue from freight per *revenue train* mile (a) (b)	$4.56	$4.53	$0.03	.66
Average revenue per ton per mile (cents)	1.175	1.162	.013	1.12
Average distance carried (miles)	231.77	255.32	—23.55	9.22
Passenger Traffic.				
Revenue passengers carried	39,989,058	40,190,200	—201,142	.50
Revenue passengers carried one mile	1,808,133,603	1,805,834,993	2,298,610	.13
Revenue from passenger trains per mile of road (a)	$4,570.09	$4,553.98	$16.11	.35
Revenue from passenger trains per *revenue train* mile (a) (c)	$1.78	$1.89	—$0.11	5.82
Average revenue per passenger per mile (cents)	2.215	2.188	.027	1.23
Average distance carried (miles)	45.22	44.93	.29	.65

Note.—The material carried for the construction of additional main tracks and the construction of new lines on which a rate of freight is charged was dealt with as commercial freight in last year's results. This material has been excluded from commercial freight in this year's results, and is separately shown in Table No. 31.

(a) Based on traffic over rail lines only, length of ferries used between rail stations excluded in distance over which traffic was moved. (b) Based on revenue freight train and all mixed train miles. (c) Based on revenue passenger train, and *all* mixed train miles, including miles run by motor cars.

Compared with the preceding year, the per cent. of operating expenses to the gross revenues was as follows:

Rail Lines.	This Year.	Last Year.
For "Maintenance" (*Maintenance of Way and Structures, and Maintenance of Equipment*)	25.59	25.62
For "Operation" (*Traffic Expenses, Transportation Expenses, and General Expenses*)	35.54	33.41
Total rail lines	61.13	59.03
Total rail lines and outside operations	64.10	61.67

The operating revenues and operating expenses for the year for all lines, distributed in accordance with the accounting regulations of the Interstate Commerce Commission, are shown in Table No. 28, and for each company in Table No. 29. Details of passenger and freight traffic are shown in Tables Nos. 31 and 32.

The expenses of the rail lines for "Maintenance" decreased $705,760.27 or 2.21 per cent.; expenses for "Operation" increased $1,713,385.69 or 4.12 per cent., a net increase of $1,007,625.42 or 1.37 per cent.

The increase resulted from higher wage schedules, greater cost of locomotive fuel, and the increase in passenger train mileage.

There were in service 34 gasoline motor cars. The mileage of these cars, aggregating 686,088 miles, or 2.88 per cent. of the total revenue passenger train mileage, is included in the mileage statistics.

The increase in expenses for outside operations occurred principally in the operation of the steamship lines, and was the result in part of higher wage schedules, increased rental for new piers in New York, and of the increase in service to the public.

In the following statements the operating expenses, although distributed as provided for in the classification of the Interstate Commerce Commission, have been combined under comprehensive titles of accounts so as to present the year's expenses in a concise form.

Maintenance of Way and Structures.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Average miles of railway operated and maintained —first and additional main tracks	10,113.64	9,989.40	124.24	1.24
Ballast	$224,782.13	$438,785.22	—$214,003.09	48.77
Ties	2,004,200.00	1,900,097.81	104,102.19	5.48
Rails	757,163.48	812,116.76	—54,953.28	6.77
Frogs, switches, and other track material	1,509,563.48	1,722,552.05	—212,988.57	12.36
Total material for roadway and track	$4,495,709.09	$4,873,551.84	—$377,842.75	7.75
Repairs of roadway and track	6,499,314.98	6,357,014.43	142,300.55	2.24
Bridges, trestles, and culverts	1,178,396.55	1,203,268.68	—24,872.13	2.07
Buildings, grounds, and appurtenances	2,210,535.30	2,178,647.77	31,887.53	1.46
Snow and sand fences and snow sheds	147,113.53	181,324.31	—34,210.78	18.87

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Electric power, telegraph, and telephone lines	113,589.79	138,810.69	—25,220.90	18.17
Superintendence	873,995.05	832,846.56	41,148.49	4.94
Stationery and printing	39,230.62	40,138.91	—908.29	2.26
Other expenses	69,124.83	92,817.18	—23,692.35	25.53
Property abandoned	262,120.09	200,284.85	61,835.24	30.87
Total	$15,889,129.83	$16,098,705.22	—$209,575.39	1.30
Cost per mile—all main tracks	$1,571.06	$1,611.58	—$40.52	2.51

The expenditures this year include $193,106.15 for account of the new steel bridges across the Willamette River at Portland, Ore., and the Sacramento River at Sacramento, Cal., required by the construction of second main track.

The following rails, ties, tie plates, and continuous rail joints were used in making renewals and the entire cost thereof charged to operating expenses, with the exception of $645,657.84 for increased weight of rail and improved frogs and switches charged to additions and betterments in accordance with the Classifications of Expenditures for Additions and Betterments promulgated by the Interstate Commerce Commission:

	This Year.	Last Year.	Decrease.
Miles of new steel rails (track miles)	483.11	757.74	274.63
Per cent. of renewal of all rail in track, including sidings	3.56	5.69	2.13
Number of burnettized ties	2,211,334	2,231,076	19,742
Number of other ties	1,378,821	1,383,337	4,516
Total number of ties	3,590,155	3,614,413	24,258
Equal to miles of continuous track	1,258.44	1,277.18	18.74
Per cent. of renewal of all ties in track, including sidings	9.27	9.59	.32
Number of tie plates	5,365,865	6,647,605	1,281,740
Equal to miles of continuous track	940.43	1,174.49	234.06
Number of continuous rail joints	372,598	566,798	194,200
Equal to miles of continuous track	582.19	805.11	222.92

The weight of rails per yard in main line and branches at the close of the year was as follows:

Miles of first and additional main tracks operated and maintained.	Total.	164-lb.	141-lb.	116-lb.	96-lb.	90-lb.	80-lb.	76-lb. and 75-lb.	70-lb.	65-lb.	61.5-lb. and 60-lb.	56-lb.	54.6-lb. and 54-lb.	52-lb. and less than 52-lb.
Main line	5,636.24	—	1.09	—	20.36	1,145.94	2,532.21	1,801.78	—	—	108.47	.98	—	25.41
Branches	4,507.96	.05	1.69	.24	.02	126.99	193.91	854.46	9.44	264.43	1,506.17	142.24	271.24	1,137.08
Total	10,144.20	.05	2.78	.24	20.38	1,272.93	2,726.12	2,656.24	9.44	264.43	1,614.64	143.22	271.24	1,162.49
Per cent. of total miles of track	100.00	—	.03	—	.20	12.55	26.87	26.19	.09	2.61	15.92	1.41	2.67	11.46
Per cent. last year	100.00	—	.02	—	.21	7.69	27,96	27.14	.11	2.44	17.35	1.31	2.97	12.80

At the timber-treating plants of the Companies, 3,278,208 cross ties and 21,307 switch ties were burnettized, and 632,805 cubic feet of piling and other timber were creosoted.

Maintenance of Equipment.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Locomotives	$6,352,424.32	$6,452,213.63	—$99,789.31	1.55
Passenger train cars	1,840,836.49	1,913,598.23	—72,761.74	3.80
Freight train cars	5,307,918.95	5,665,182.95	—357,264.00	6.31
Work equipment	375,290.21	338,764.54	36,525.67	10.78
Floating equipment	307,408.23	331,417.59	—24,009.36	7.24
Shop machinery and tools	361,183.79	372,183.43	—10,999.64	2.96
Superintendence	640,961.50	631,900.65	9,060.85	1.43
Other expenses	126,182.30	103,129.65	23,052.65	22.35
Total	$15,312,205.79	$15,808,390.67	—$496,184.88	3.14

The decrease in these expenses resulted principally from a decrease of 22,971,094 miles or 4.16 per cent. in the miles run by freight and caboose cars, and from a less number of locomotives and cars vacated.

As in the past, the companies have charged to operating expenses the original cost (estimated if not known) or purchase price, less salvage, of all rolling stock condemned, destroyed, sold, or vacated from any cause during the year. The sums thus charged are reported under "Renewals" in Table No. 28, and amounted for the year to $973,092.45.

The average cost of repairs and renewals per locomotive (excluding motor cars) and per car per annum, and the average number of serviceable locomotives and cars owned during the year were:

	Average Cost Per Annum. (*Including original cost, less salvage, of equipment vacated.*) This Year.	Last Year.	Average Serviceable Number. This Year.	Last Year.
Locomotives, for repairs	$3,361.12	$3,342.82		
for renewals	155.17	208.09		
Total	$3,516.29	$3,550.91	1,803	1,821
Passenger train cars, for repairs	$1,005.73	$1,032.14		
for renewals	44.30	86.25		
Total	$1,050.03	$1,118.39	2,019	1,883
Freight train cars, for repairs	$101.80	$108.55		
for renewals	11.55	17.70		
Total	$113.35	$126.25	46,829	44,873

The equipment owned by the respective Companies is shown in Table No. 25, and the capacity, the service, and the average cost of maintenance, are shown in Tables Nos. 33, 34 and 35.

Traffic Expenses.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Outside agencies	$1,027,790.73	$964,728.18	$63,062.55	6.54
Advertising	1,027,180.27	680,402.51	346,777.76	50.97
Superintendence	638,244.61	582,875.60	55,369.01	9.50
Stationery and printing	217,047.51	210,652.50	6,395.01	3.04
Other expenses	36,800.46	42,527.51	—5,727.05	13.47
	$2,947,063.58	$2,481,186.30	$465,877.28	18.78

Transportation Expenses.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Locomotives, fuel for	$9,423,602.40	$9,061,522.80	$362,079.60	4.00
Locomotive service, other than fuel	7,520,221.55	7,306,933.04	213,288.51	2.92
Train service	6,127,538.50	5,865,668.33	261,870.17	4.46
Station and terminal service	8,838,858.98	8,627,740.71	211,118.27	2.45
Ferry and river service	660,885.07	675,816.87	—14,931.80	2.21
Injuries, loss, damage, and other casualties	1,946,513.04	2,256,754.68	—310,241.64	13.75
Superintendence	1,572,868.21	1,459,396.31	113,471.90	7.78
Stationery and printing	328,563.15	331,100.99	—2,537.84	.77
Other expenses	105,534.20	73,111.99	32,422.21	44.35
	$36,524,585.10	$35,658,045.72	$866,539.38	2.43

The increase in these expenses resulted from higher wage schedules, the higher prices paid for locomotive fuel, and the increase in passenger train mileage.

The average number of tons of freight per train, of loaded cars per train (excluding caboose), and of tons per loaded car for the year were:

Commercial and Company Freight. (Way-bill Tonnage.)	*Tons per Train. Tons.	+Increase. —Decrease. Tons.	Per Cent.	Loaded Cars per Train. Cars.	+Increase. —Decrease. Cars.	Per Cent.	Per Cent. of Loaded Car Mileage to Total Car Mileage.	Tons per Loaded Car. Tons.	+Increase. —Decrease. Tons.	Per Cent.
Lines east of El Paso	387.36	+4.57	1.19	19.38	+ .49	2.59	68.82 — 1.47	19.99	— .28	1.38
Lines west of El Paso	527.87	— .28	.05	25.54	+ .52	2.08	72.06 + .60	20.67	— .44	2.08
Average all lines	473.93	—2.10	.44	23.18	+ .36	1.58	70.99 — .12	20.45	— .41	1.97

*Ton miles per revenue freight train and all mixed train miles.

The work done by the transportation department of the rail lines compared with that of last year is as follows:

	Increase.	Decrease.	Per Cent.
Gross operating revenues	—	$2,612,876.98	2.10
Transportation expenses	$866,539.38	—	2.43
Revenue passengers carried one mile	2,298,610	—	.13
Mileage of cars in passenger service	10,275,919	—	6.86
Locomotive mileage with passenger and mixed trains, including helping	1,702,997	—	6.80
Tons of commercial freight carried one mile	—	438,900.334	6.62
Tons of commercial and company freight carried one mile	—	492,838,047	6.18
Mileage of cars in freight service	—	22,971,094	4.16
Locomotive mileage with freight and mixed trains, including helping	—	1,324,394	6.45
Total locomotive mileage in service for which the attendant expenses are charged to "Transportation Expenses"	122,315	—	.23

The cost per locomotive mile (excluding motor cars) run in revenue service and in non-revenue service for which the expenses are charged to "Transportation Expenses" was:

	This Year.	Last Year.	+Increase. —Decrease.
Fuel for locomotives	17.93 cents.	17.19 cents.	+ .74 cents.
For all transportation expenses	68.57 cents.	67.64 cents.	+ .93 cents.

General Expenses.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Salaries and expenses of general officers	$287,889.88	$300,944.92	—$13,055.04	4.34
Salaries and expenses of clerks and attendants	1,838,686.48	1,649,445.36	189,241.12	11.47
Law expenses	506,785.83	491,720.43	15,065.40	3.06
General office expenses	215,899.22	203,845.70	12,053.52	5.91
Stationery and printing	165,839.92	157,685.82	8,154.10	5.17
Insurance	340,941.02	310,574.31	30,366.71	9.78
Pensions	182,482.41	175,090.77	7,391.64	4.22
Other expenses	310,150.78	178,399.20	131,751.58	73.85
Total	$3,848,675.54	$3,467,706.51	$380,969.03	10.99

ELECTRIC LINES.

The many attractions of California to tourists, and as a place for village and suburban residence, as well as for outdoor life generally, with its temperate climate and the absence of snow, make it an attractive field for suburban electric railway transportation. In 1903 the Southern Pacific Company acquired 50 per cent. of the capital stock of the Pacific Electric Railway Company, which had previously projected and was then rapidly extending from Los Angeles into a large radius of Southern California, an extensive system of suburban electric railway lines designed to carry freight as well as passengers, and thereafter, until November 1, 1910, it was managed by a Board of Directors elected by joint agreement of the Southern Pacific Company and Mr. H. E. Huntington, who, with his associates, owned the other 50 per cent. of the stock. On the latter date this company took over the entire stock and the exclusive management of the Company. At the same time in the same transaction, it disposed of its stock, amounting to 45 per cent., in the Los Angeles Railway Company, which owned or operated the street railway lines in Los Angeles and certain city lines of the Pacific Electric Railway Company, which were not a part of and in no wise necessary to the suburban system. It was believed that the street railway lines in a city so large as Los Angeles could not be utilized as feeders and were not otherwise useful to the transportation system operated by the Southern Pacific Company. The Pacific Electric Railway Company owned the stock of the Los Angeles Inter-Urban Railway Co., the Riverside & Arlington Railway Co., the San Bernardino Valley Traction Co., the San Bernardino Inter-Urban Railway Co., and the Redlands Central Railway Co. The Southern Pacific Company had already acquired the entire capital stock of the Los Angeles Pacific Company, and, on November 1, 1910, in connection with the acquisition of the outstanding 50 per cent. of the stock of the Pacific Electric Railway Company, acquired the entire capital stock of the Los Angeles & Redondo Railway Co.

In order to unify the operations of these several systems and effect important economies, as well as to improve the service to the public, all these companies were, on September 1, 1910, consolidated pursuant to the Laws of the State of California under the name of *Pacific Electric Railway Company*. All of the stock of this company (except shares necessary to qualify directors) is owned by the Southern Pacific Company. The lines of the consolidated company are shown on the map on the opposite page. The mileage owned is as follows:

Single main track	209.41	miles.
Double main track	269.61	"
Four main tracks	11.43	"
Total road miles	490.45	"
Equal to single track miles	794.35	"
Spurs and sidings	87.30	"
Total	881.65	"

The Company owns also 14 electric locomotives, 507 passenger motor cars, 19 passenger, express, and mail motor cars, 53 other passenger train cars, 33 express freight motor cars, 6 express freight trailer cars, 1,115 other freight train cars, and 72 service cars.

Of the 794.35 miles of single track, 549.93 miles are on private right of way and 244.42 miles on public highway.

The outstanding bonded indebtedness of the new company is $49,693,000, the annual interest on which sum amounts to $2,394,920. Of the total outstanding bonds $20,939,000 is owned by the Southern Pacific Company.

The earnings and expenses of the consolidated lines for the four months ended October 31, 1911, compare with the similar period last year as follows:

	Four months this year.	Four months last year.	+Increase. —Decrease.
Gross operating revenue	$3,057,173.40	$2,987,714.62	+$69,458.78
Operating expenses and taxes	1,999,323.25	2,081,639.80	—82,316.55
Surplus over expenses and taxes	$1,057,850.15	$906,074.82	+$151,775.33

The suburban districts of Southern California served by these lines, as well as others into which it is designed in due time to extend them, are developing and the population is increasing rapidly; therefore it is believed that the lines will soon become not only profitable in and of themselves, but will be of very great value as feeders to the steam railroad lines operated by the Southern Pacific Company.

At various times in former years and for the same reason above suggested, the Southern Pacific Company acquired the control of the Stockton Electric Railroad Co., owning 6.25 miles of double main track in the City of Stockton; of the Peninsular Railway Co., owning 51.62 miles of single and 14.97 miles of double main track, serving the cities of Palo Alto and San Jose and the country adjacent thereto; of the Visalia Electric Railroad Co., owning 23.69 miles of single main track, serving the towns of Visalia, Exeter, and Lemon Cove and the country adjacent thereto; of the Fresno Traction Company, owning 2.96 miles of single and 11.27 miles of double main track, serving the city of Fresno and the country adjacent thereto, and of the San Jose Railroads, owning 15.81 miles of single and 11.73 miles of double main track, serving the cites of San Jose and Santa Clara and the country adjacent thereto.

Notwithstanding the very low rates which have prevailed for many years for suburban passenger traffic conducted by the Company by its ferries from San Francisco to the Oakland Mole and Alameda Mole, and thence by trains into Oakland, Alameda and Berkeley, and into other San Francisco Bay districts, it was deemed necessary to improve the service by the electrification of the suburban lines connecting with the ferries, and reaching into the cities and districts mentioned; therefore in the year 1908, a complete plan for such electrification involving an estimated expenditure of $10,702,300 was adopted and work commenced which is now nearing completion; the expenditures on June 30, 1911, amounted to $6,578,294.90.

GENERAL.

Under the concessions granted for the construction of the railway of the Southern Pacific Railroad Company of Mexico, referred to in former reports, there were completed during the year 12.56 miles, making a total of 912.25 miles of railway completed to June 30, 1911. The miles of railway projected under the concessions, the miles completed, under construction, and remaining to be constructed are as follows:

	Projected — Miles.	Constructed to June 30, 1911. — Miles.	Remaining to be Built. Under Construction. — Miles.	Remaining to be Built. To be Built. — Miles.
Main Line—Empalme to Guadalajara	839.13	682.43	32.30	124.40
Branch Lines	652.51	229.82	—	422.69
Total	1,491.64	912.25	32.30	547.09

Under the concession as revised November 3, 1910, the time for the completion of the main line from Empalme to Guadalajara was extended to November 6, 1915, and for the branch lines to November 11, 1920.

The advances by the Southern Pacific Company for account of the construction of these lines amounted, on June 30, 1911, to $38,138,720.60. Interest accruing on these advances during the year has not been taken into either the income or the assets of the Company.

The revolutionary movement in the Republic of Mexico did not manifest itself in active hostilities until October, 1910. It was then confined to the States of Chihuahua and Coahuila, and did not extend to the Company's lines in the State of Sinaloa until April, 1911. The bridges and trestles then destroyed were replaced, but, during the month of May, the interruption from this cause became so frequent that the traffic over the line was practically suspended. The armistice which followed the battle of Juarez on the 8th, 9th and 10th of May, 1911, resulted in the cessation of hostilities and the restoration of peace. The bridges and structures destroyed were replaced and traffic was resumed on the 13th day of June following.

On May 31, 1911, the Mexican Congress passed an act appropriating 15,000,000 pesos to pay all direct loss and damage caused by the Revolutionary Army upon private property. Under the provisions of this Act, the Sonora Railway and the Southern Pacific Railroad of Mexico have filed claims, which are now pending before the Commission. The claims amount to 288,118.74 pesos.

In addition to the completed lines of railway reported under "Properties and Mileage" and the railway of the Southern Pacific Railroad Company of Mexico, hereinbefore referred to, construction is progressing on the following lines:

	Length of Projected Line — Miles.	Track Completed. — Miles.	Grading Completed. — Miles.	Grading Progressing. — Miles.
Arizona Eastern Railroad:				
Phoenix to Hassayampa, Arizona	39.22	39.22		
Winkelman to San Carlos, Arizona	32.79	7.29		
Hayden Jct. to Winkelman, Arizona	4.28	1.56	1.13	
Oregon Eastern Railway:				
Klamath Falls, Oregon, North	86.40	28.07	.40	8.03
Natron, Oregon, South	105.40	24.42	7.79	2.03
Oregon Western Railway:				
Drain to Marshfield, Oregon	73.22	—	.51	
Pacific Railway & Navigation Company:				
Hillsboro to Tillamook, Oregon	91.00	77.70	12.88	.16
Sacramento Southern Railroad:				
Sacramento to Walnut Grove, California	23.90	10.25	13.47	.18

Under the pension system put into effect on January 1, 1903, there are carried on the pension rolls of the rail and water lines 503 employes. The payments to them for the year amounted to $191,325.57.

The accompanying report of the Vice-President and Controller shows fully and in detail the financial and other transactions of the Companies.

By order of the Board of Directors,

ROBERT S. LOVETT,

Chairman of the Executive Committee.

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES.

NO. 2.—COMBINED INCOME ACCOUNT FOR THE YEAR ENDED JUNE 30, 1911.

(Revenues and Expenses of "Proprietary" and "Non-Proprietary" Lines and Miscellaneous Income of the Southern Pacific Company and Proprietary Companies, combining details shown in Tables Nos. 9 and 15.)

Operating expenses (and taxes) of proprietary lines, interest on funded debt and all other expenses of Proprietary Companies as shown in detail in Table No. 15		$104,620,742.33
Operating expenses, taxes, and all other expenses incurred in connection with the operation of the following non-proprietary lines:		
New Mexico & Arizona R. R.	$279,975.36	
Sonora Railway	885,047.66	
		1,165,023.02
Disbursements of Southern Pacific Company (Table No. 9):		
Expenses of operating steamship lines		6,754,750.81
Interest on funded debt as shown in detail in Table No. 6		5,149,988.24
Interest due to Proprietary Companies on advances and open accounts	$1,408,412.98	
Less interest due from Proprietary Companies including interest charged to Oregon & California R. R. Co.	1,250,017.04	
		158,395.94
Rental to Central Pacific Railway Co.		10,000.00
Rental to Nevada & California Railway Co.		5,000.00
Rental to Oregon & California Railroad Co.		5,000.00
Rental to Southern Pacific Railroad Co.		10,000.00
Taxes		181,679,61
General and miscellaneous expenses		110,023.61
Annual payment for redemption of San Francisco Terminal bonds		5,000.00
Reserve for depreciation of rolling stock owned and leased to other companies		866,547.65
Cost of surveys written off		17,742.38
Cost of examinations for water power written off		10,472.17
Balance to profit and loss (Table No. 3)		26,088,992.68
Total		$145,159,358.64

Revenues of proprietary lines and miscellaneous income of Proprietary Companies as shown in detail in Table No. 15		$127,682,104.79
Revenues of the following non-proprietary lines:		
New Mexico & Arizona R. R.	$254,710.81	
Sonora Railway	707,148.44	
		961,859.25
Revenues of Southern Pacific Company (Table No. 9):		
Gross revenue from operation of steamship lines		7,071,528.78
Interest on bonds owned of Proprietary Companies		787,682.22
Interest on bonds owned of companies other than Proprietary Companies		2,934,775.94
Dividends on stocks owned as shown in detail in Table No. 5		778,336.08
Rentals from lease of road		1,994,091.13
Hire of equipment		1,927,488.28
Rentals from lease of joint tracks, yards, and terminal facilities		193,436.60
Miscellaneous rentals		112,341,00
Net proceeds from sale and lease of lands		11,582.70
Balance of interest on loans and on open accounts other than with Proprietary Companies		690,351.59
Miscellaneous income		13,780.28
Total		$145,159,358.64

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES.

NO. 3.—COMBINED PROFIT AND LOSS—JUNE 30, 1911.

(Combining details as shown in Tables Nos. 10 and 16.)

Dividends on stocks of Proprietary Companies, viz.:		
Central Pacific Ry. Co. preferred	$684,000.00	
Central Pacific Ry. Co. common	6,727,550.00	
Houston & Shreveport R. R. Co.	120,000.00	
Houston & Texas Central R. R. Co.	2,000,000.00	
Louisiana Western R. R. Co.	504,000.00	
Morgan's Louisiana & Texas R. R. & S. S. Co.	900,000.00	
Nevada & California Ry. Co.	193,480.00	
Southern Pacific R. R. Co.	9,600,000.00	
Southern Pacific Terminal Co.	120,000.00	
	$20,849,030.00	
Less paid to Southern Pacific Co.	20,847,946.00	
		$1,084.00
Dividends on common stock of Southern Pacific Co., viz.:		
One and one-half per cent. paid January 3, 1911	$4,090,084.58	
One and one-half per cent. paid April 1, 1911	4,090,085.48	
One and one-half per cent. payable July 1, 1911	4,090,086.08	
One and one-half per cent. payable October 2, 1911	4,090,086.08	
		16,360,342.22
		$16,361,426.22
Discount and commissions on securities sold		5,105,569.35
Premium on bonds purchased and cancelled		12,242.50
Cost on books, less salvage, of property abandoned		195,923.99
Uncollectible accounts written off		23,985.00
Balance June 30, 1911, viz.:		
Southern Pacific Company	$64,137,198.01	
Proprietary Companies	80,621,755.37	
		144,758,953.38
		$166,458,100.44

Balance June 30, 1910, viz.:		
Southern Pacific Company	$54,756,476.75	
Proprietary Companies	80,448,836.27	
		$135,205,313.02
Balance from income account (Table No. 2)		26,088,992.68
Proceeds from sale of unpledged lands		171,172.81
Proceeds from sale of lands pledged for the redemption of bonds		1,034,158.03
Collection of old accounts		711,299.29
Annual payments to sinking funds and income from sinking fund investments		374,712.54
Adjustments in unsettled claims and accounts		818,261.04
Profit on bonds sold		314,968.27
Difference between cost on books and amount received for property sold		36,878.75
Difference between cost and face value of $2,314,500 Central Pacific Ry. Three and One-Half Per Cent., $26,000 Central Pacific Ry. First Refunding Four Per Cent., $800,000 Galveston, Houston & Northern Ry. First Mortgage Five Per Cent., $2,224,000 Gulf, Western Texas & Pacific Ry. First Mortgage Five Per Cent., $842,000 New York, Texas & Mexican Ry., Matagorda Division, Six Per Cent., and $13,000 Southern Pacific R. R. First Refunding Mortgage Four Per Cent. bonds purchased and retired		1,162,504.96
Difference between amounts in suspense credited in former years to contingent liabilities and amounts paid in settlement		495,873.12
Old accounts written off		43,965.93
		$166,458,100.44

NO. 11.—SOUTHERN PACIFIC COMPANY—ASSETS—JUNE 30, 1911.

Assets.	June 30, 1911.	*June 30, 1910.
Capital Assets.		
Stocks and bonds owned—Table Nos. 12, 13 and 14	$342,139,975.55	$329,493,190.30
Bay Shore Line terminals, and other real estate	36,647,704.94	30,830,254.21
Timber treating plants, saw mills, and other property	389,723.95	404,698.70
Steamships and other floating equipment—Table No. 24	13,767,289.43	12,625,710.07
Rolling stock—Table No. 25	18,847,153.50	15,820,165.81
Advances for Oakland-Berkeley electric lines	6,578,294.90	2,579,554.49
Advances for construction and acquisition of new lines	42,550,193.07	32,477,147.99
Advances to Southern Pacific Railroad Co. of Mexico	38,138,720.60	35,965,601.75
Advances to electric lines in California	14,244,045.22	12,103,947.75
Advances to Kern Trading & Oil Co	5,129,821.49	4,086,700.63
Advances to Pacific Fruit Express Co	2,208,492.79	1,165,212.25
Lands and other investments	2,531,599.07	1,908,905.19
Total	$523,173,014.51	$479,461,089.14
Sinking funds	295.83	1,044.00
	$523,173,310.34	$479,462,133.14
Current Assets.		
Cash	$11,139,809.25	$10,718,579.79
Time loans and deposits	24,963,456.67	17,047,375.62
Loans and notes receivable	1,023,927.54	3,316,788.85
Agents and conductors	1,098,284.52	2,006,158.68
Income accrued to June 30 on securities owned	1,247,131.30	1,113,904.35
Individuals and companies	2,744,429.42	3,237,510.52
U. S. Government transportation	780,796.19	907,525.38
Material and supplies	13,895,338.50	11,241,592.98
	$56,893,173.39	$49,589,436.17
Deferred Assets.		
Individuals and companies	$461,074.69	$182,422.13
Proprietary Companies.		
Direct Navigation Co	$38,789.18	$46,474.76
Galveston, Harrisburg & San Antonio Ry. Co.	10,575,823.87	10,391,263.47
Louisiana Western R. R. Co	83,462.87	42,334.49
Morgan's Louisiana & Texas R. R. & S. S. Co.	1,598,248.49	664,768.68
Nevada & California Ry. Co	199,723.84	42,823.93
Oregon & California R. R. Co	3,771,116.87	4,946,702.45
Southern Pacific Terminal Co	—	21,533.35
Texas & New Orleans R. R. Co	48,496.54	—
	$16,315,661.66	$16,155,901.13
Due from other Proprietary Companies	$537,779.77	$1,304,416.41
Contingent Assets.		
San Antonio & Aransas Pass Ry. Co.†	$1,754,700.09	$1,390,753.59
Individuals and companies	380,321.57	31,784.07
Unadjusted accounts—Proprietary Companies	109,885.69	138,184.78
Expended for account of Colorado River Crevasse	4,040,648.61	4,022,480.29
	$6,285,555.96	$5,583,202.73
Total assets	$603,666,555.81	$552,277,511.71

*The assets for last year have been restated to accord with the classification observed this year. †Includes $3,898,000 face value, San Antonio & Aransas Pass Ry. Co. Income Four Per Cent. Bonds, on which interest is payable on January 1, of each year if earned, out of net earnings and income.

NO. 11.—SOUTHERN PACIFIC COMPANY—LIABILITIES—JUNE 30, 1911.

Liabilities.	June 30, 1911.	June 30, 1910.
Capital Liabilities.		
Common stock	$272,672,405.64	$272,672,305.64
Preferred stock called for redemption but not presented	3,325.00	18,325.00
Total capital stocks	$272,675,730.64	$272,690,630.64
First mortgage six per cent. steamship bonds, due January 1, 1911	—	$1,644,000.00
Four per cent. gold bonds (Central Pacific Stock Collateral), due August 1, 1949: Authenticated by Trustee. $34,018,500.00 Less in treasury 5,249,000.00	$28,769,500.00	28,769,500.00
Four per cent. twenty-year convertible bonds, due June 1, 1929	81,148,000.00	81,137,000.00
Four per cent. convertible bonds—subscription receipts and scrip	3,910.00	15,040.00
Four and one-half per cent. twenty-year gold bonds, due July 1, 1929	227,000.00	227,000.00
San Francisco Terminal first mortgage four per cent. bonds, due April 1, 1950	18,995,000.00	15,000,000.00
Total funded debt	$129,143,410.00	$126,792,540.00
	$401,819,140.64	$399,483,170.64
Current Liabilities.		
Coupons matured but not presented	$92,609.50	$118,635.00
Coupons due July 1	3,104,232.50	3,199,600.00
Interest accrued on bonds and loans to June 30, but not due	3,971,133.33	3,379,871.25
Dividends due—unpaid	139,956.96	120,242.57
Dividends due, July 1 and October 2	8,180,172.16	8,180,168.73
Mortgage bonds satisfied	—	21,000.00
Traffic and car service	653,076.76	322,562.42
Due to Union Pacific Railroad Company	20,007,305.41	10,901,568.97
Vouchers and payrolls	7,656,407.53	9,762,361.83
	$43,804,894.15	$36,006,010.77
Deferred Liabilities.		
Pacific Mail Steamship Co	$79,567.35	$198,220.04
Taxes assessed but not due	439,935.60	346,042.69
Wells Fargo & Co.'s Express contract	112,000.00	144,000.00
Sinking fund uninvested	295.83	—
	$631,798.78	$688,262.73
Proprietary Companies.		
Central Pacific Ry. Co	$34,639,092.32	$4,364,732.82
Houston, East and West Texas Ry. Co	264,723.50	157,742.85
Houston & Shreveport R. R. Co	22,850.52	39,262.72
Houston & Texas Central R. R. Co	1,586,952.80	732,192.87
Southern Pacific R. R. Co	39,623,464.90	40,146,628.73
Southern Pacific Terminal Co	4,133.10	—
Texas & New Orleans R. R. Co	—	377,216.14
	$76,141,217.14	$45,817,776.13
Due to other Proprietary Companies	$2,313,064.67	$1,349,172.58
Contingent Liabilities.		
Marine insurance fund	$3,175,954.02	$3,180,381.32
Steamship insurance fund	1,607,697.54	1,607,697.54
Floating equipment replacement fund	5,571,623.83	5,447,809.15
Reserve for replacement and depreciation of rolling stock	1,253,188.65	1,481,082.40
Insurance fund	353,599.16	225,919.00
Unadjusted accounts	2,743,926.39	2,075,991.87
Principal of deferred payments on land contracts	113,252.83	157,760.83
	$14,819,242.42	$14,176,642.11
Total liabilities	$539,529,357.80	$497,521,034.96
Balance to credit of profit and loss	64,137,198.01	54,756,476.75
Total liabilities	$603,666,555.81	$552,277,511.71